STATE OF VERMONT
Agency of Human Services

Agency Medicaid Enterprise Architecture Analysis

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Revision History

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Section 1 – Executive Summary

"Committing to an ongoing, renewable Enterprise Architecture process promotes a business-aligned, technology-adaptive enterprise. Enterprise Architecture generates a road map that can provide guidance for future investments and will identify and aid in the resolution of gaps in the organization's business and IT functions." – The National Association of State Chief Information Officers (NASCIO)

The State of Vermont is committed to transitioning its current Medicaid program to a business-aligned, technology-adaptive enterprise. To achieve this objective, the State has embarked on a journey to improve the efficiency of its Medicaid program by optimizing the potential benefits of health information technology through the systematic application of a comprehensive, enterprise-wide system architecture.

The State's Agency of Human Services (AHS) is planning and implementing operational and technical modifications to support the goals of federal health care reform, as well as the State's health care reform initiatives including the Challenges for Change initiative and new information system procurements. These system procurements included the Vermont Integrated Eligibility Workflow System (VIEWS) and the Medicaid Enterprise Solution (MES), replacement systems for the existing eligibility system and Medicaid Management Information System (MMIS). These changes require a transition from the existing discrete siloed systems of an aging information technology infrastructure to a set of technical components of an enterprise-wide service-oriented architecture (SOA).

The first step in this transition was accomplished with the release of a Request for Proposal (RFP) for essential SOA components to provide the foundation for the Agency's Enterprise Architecture (EA). The Agency anticipates these components will support the Challenges for Change initiatives as well as the procurements of the new MES (to replace the existing MMIS) and VIEWS (to replace the existing integrated eligibility system). The essential SOA components defined within this RFP included:

- Enterprise Service Bus (ESB);
- Workflow Engine;
- Rules Engine;
- Enterprise Master Person Index (eMPI); and
- Identity Management.

Subsequent steps of this transition were to release the VIEWS and the MES RFPs for systems that SOA compliant and aligned with the Medicaid Information Technology Architecture (MITA) Framework 2.01. To supplement this transition, the Agency Medicaid Enterprise Architecture Analysis has been developed to assess the Agency's current architecture, to identify the Agency's goals and needs, and to set a direction for the Agency's future EA.

1.1 Approach to the Medicaid EA Analysis

Understanding the current Vermont Medicaid program and operation was essential to the creation of the Agency Medicaid Enterprise Architecture Analysis. All relevant documentation regarding the current Vermont Medicaid organization, policies, regulations, and current operations was reviewed in order to prepare a complete description of the current Medicaid program and operations. Business and technology strategic objectives were also reviewed and discussed. Based on this data, AHS has crafted a vision of the desired future Enterprise Architecture and a roadmap for achieving this vision.

The MITA Framework was developed by the Centers for Medicare and Medicaid Services (CMS), and provides the basis for the analysis and presentation of the current and future states of the EA. As a result, the analysis was structured around the business, information, and technical components of the MITA Framework.

After summarizing the current status of existing Medicaid-related infrastructures, a "to-be" vision was developed to generate a comprehensive view of the future state of the Agency's EA. This future state analysis addressed the information and technical components required to support the modified business processes necessary to modernize Vermont's Medicaid enterprise.

It is expected that the future vision of the Enterprise will provide the foundation for all activities associated with building the new MES and the associated business process reengineering required for consistency with the latest version of the MITA Framework. It will also include the Agency's plans to implement and expand the use of service-oriented architecture.

The models and hierarchies presented within this document were designed to be expandable and adaptable to the Agency's non-Medicaid business processes and supporting technologies. For example, the Agency could apply these models to non-health care business functions performed by its departments such as Child's Integrated Services, managed within the Department for Children and Families (DCF).

1.2 Overview of the Medicaid EA Analysis

The Agency Medicaid Enterprise Architecture Analysis provides an overview of the Agency's current EA, documents current plans and initiatives underway to improve the EA, and maps out possible future architecture models. The current or "as-is" sections of this document contain a description and analysis of the Agency's current environment. The "evolving" sections describe current projects underway across the Agency and their desired impacts upon the architectures. The future-related sections examine the Agency's goals and objectives for the evolving EA within the framework provided by MITA.

Descriptions of the current, evolving, and future environments are presented within the structure prescribed by the MITA Framework. Currently, the MITA Framework is evolving to be more comprehensive and to address the significant changes occurring within both the healthcare and technology industries. Similarly, MMIS vendors are transforming their systems to incorporate new business functionality, building upon the principles of enterprise-level SOA. As such, it is critical to understand each vendor's solution vision and progress towards delivering a MITA and SOA compliant system, and how that roadmap aligns with Vermont's vision for their future state MES, and the objectives of the State Health Information Technology Plan.

In accordance with the CMS MITA Framework, each of the sections includes depictions of the Business Architecture, Information Architecture, and Technical (applications and network) Architecture components of the AHS environment.

1.2.1 Business Architecture

The Business Architecture section of this analysis (Section 5) describes the current organizational structure of AHS and the Medicaid services provided by the various departments within the Agency. With this framework established, the Business Architecture Analysis section (Section 5) uses the related MITA business areas to explain the current operations, review what is and what is not working well within the existing model, and present the desired functionality of the new MES. The MITA business areas provide an effective context for analyzing the Business Architecture.

The Business Architecture utilizes contemporary methodologies to construct models of business processes and capabilities that represent the existing Medicaid program and how it can evolve and be transformed in the future. AHS completed a MITA State Self-Assessment (SS-A) in 2008 during the VIEWS procurement project. This self-assessment served as input for codifying existing operations and developing high-level concepts describing the future vision. The results of the initial self-assessment have been validated and verified against the new information collected during the MES procurement project.

With an understanding of the desired future state of the Medicaid business processes, the Information and Technical Architectures necessary to achieve these goals were analyzed.

1.2.2 Information Architecture

The Information Architecture section of this report (Section 6) presents the flow of information that supports both the Business and Technical Architectures. The Information Architecture provides the bridge between the Business Architecture and the Technical Architecture, providing the framework to define Technical Architecture requirements based on business process and information needs. This architectural framework aligns the business processes to the information systems that support these

processes, promotes information sharing, and facilitates cross-agency information exchange. Using the set of business processes that provide a view of the functions of the enterprise, the Information Architecture provides the organization with a high-level model of its critical information needs.

The MITA Information Architecture provides a description of the information strategy, architecture, and data to a sufficient level that AHS can use it to define their data needs and enable the future business processes of their Medicaid enterprise. The Information Architecture uses complementary methodologies and tools to construct the data models that represent the Medicaid enterprise today and how it may evolve and be transformed in the future.

This document contains Information Architecture standards and concepts taken from the MITA Information Architecture. Additionally, we have developed a set of "data groups" based upon these standards to capture the high-level information needs of the Agency. The Agency expects current and future system procurement efforts to facilitate the creation of standards and common definitions for the data elements required to support its evolving business environment.

1.2.3 Technical Architecture

The Technical Architecture section of this report (Section 7) describes the current structure, future structure, and inter-relationships of enterprise technologies in order to create a foundation that will maximize the value of the State's investments by optimizing capabilities and processes. In the context of pending State procurement initiatives, this section examines the functionality provided by the procurement of core enterprise components, the new MES, and the planned procurement of the eligibility system, VIEWS. With this context explained, the integration of existing legacy systems is examined to leverage functionality and ensure data is accurate and accessible.

1.3 Conclusion

This Agency Medicaid Enterprise Architecture Analysis establishes a foundation which all future Medicaid technology procurements can leverage to help ensure more cohesive, efficient, and cost-effective technology solutions.

It is important to note that although the use of the MITA Framework provides a solid starting point, the EA must continue to evolve to keep pace with changing operational needs and technology advancements. As the Agency moves forward with the procurement of technical components, the need to establish an EA Governance team becomes critical. This team should consist of both business and technical user groups to ensure the different architectures are kept in-sync. As the MITA Framework is further developed and AHS' Enterprise Architecture changes, this analysis should evolve, maintaining an accurate picture of the Business, Information and Technical Architectures supporting the business functions of the Agency.

Over time, comprehensive documentation of these architectures and a ready the inventory of components will better enable the State to monitor, manage, forecast and expand as necessary to accommodate the evolving information needs of a comprehensive, integrated, dynamic Medicaid enterprise. This document provides an architectural foundation that the Agency can easily expand upon in future EA efforts, while providing the details necessary to support current procurement efforts. It was developed with the understanding that a SOA-based portfolio of components will be necessary to provide the functionality and scalability desired in the new MES and other technology solutions.

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Section 2 – Scope and Approach

2.1 Purpose

The purpose of the Agency Medicaid Enterprise Architecture Analysis document is to align information, systems, and other technical components with the business processes across the AHS enterprise. This document presents written descriptions and diagrams of the current state of the enterprise as well as a view of the future vision for the Enterprise Architecture. The future vision is documented, and the potential barriers identified, to support future procurement activities including the procurement of a new MMIS based upon the principles of MITA and a service-oriented architecture. In addition, this document can be used as a basis for AHS to expand upon and create an enterprise-wide view of its architecture.

For the purposes of this Agency Medicaid Enterprise Architecture Analysis, the following working definitions are used:

- **Enterprise** – Refers to AHS processes, information systems, personnel, and organizational sub-units.
- **Enterprise Architecture** – Refers to the practice of applying a comprehensive and rigorous method for describing a current and/or future structure and behavior for an organization's processes, information systems, personnel, and organizational sub-units, so that they align with the organization's core goals and strategic direction. Although often associated strictly with information technology, it relates more broadly to the practice of business optimization in that it addresses Business Architecture, performance management, organizational structure and process architecture as well.

AHS plans to develop a comprehensive Enterprise Architecture in two phases:

- **Phase 1** – Complete the Agency Medicaid Enterprise Architecture Analysis documenting the enterprise components necessary to supplement the MES RFP.
- **Phase 2** – Update the Agency Medicaid Enterprise Architecture Analysis based on ongoing planning and implementation activities in order to ensure a living document that will evolve over to time to encompass the entire enterprise. Use the updated document as a basis for creating an Enterprise Architecture Analysis document that will cover agencies beyond AHS and Medicaid.

This Agency Medicaid Enterprise Architecture Analysis document specifically addresses Phase 1.

2.2 Background

The CMS MITA Framework is modeled on other widely recognized and accepted capability maturity models such as Software Engineering Institute's (SEI) Capability Maturity Model Integration (CMMI). These models provide a process improvement approach for organizations by articulating the essential elements and interaction of business, information, and technical areas. These three areas are depicted in Figure 1, below.

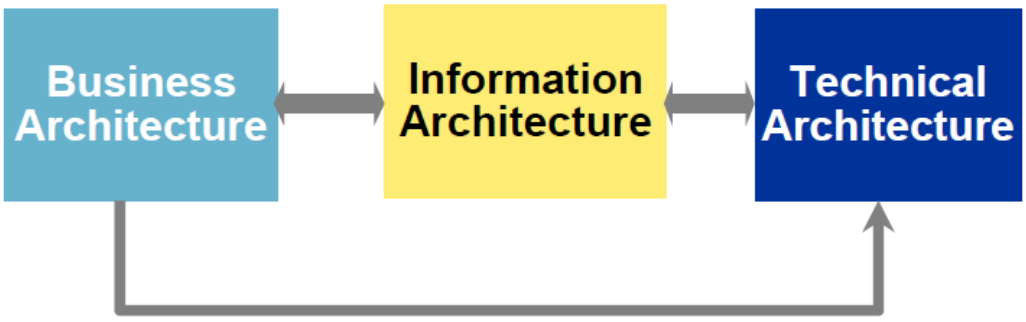

Figure 1: CMS MITA Framework Architectures

The Business Architecture is composed of the following hierarchy:

- Business Area
- Business Process
- Business Capabilities

The current CMS Business Architecture is built on eight business areas and 79 identified business processes. The business capabilities describe an organization's ability to perform business processes at a certain level of maturity. For this Agency Medicaid Enterprise Architecture Analysis, the business areas and a representative subset of the business processes are used to illustrate models for achieving a desired future state business environment.

Although the reference models for Technical and Information Architectures are not as well defined for Business Architecture, the MITA Framework will again be referenced as the model for examining Vermont's Medicaid enterprise. This decision was made to enable Vermont to evolve future versions of this architecture within the standard MITA structure, thereby allowing for easier communication with other state Medicaid programs and with CMS for future funding requests.

To accommodate ongoing changes being made both to the MITA Framework and the solutions provided by the vendor community, it is critical to provide clear definitions of industry terms, define decisive ownership boundaries, and establish a workable roadmap that incorporates higher levels of maturity that are both desirable and attainable. This

Agency Medicaid Enterprise Architecture Analysis establishes the foundation for the Agency's evolving EA.

2.3 Methodology

Our approach to completing this document consisted of in-depth reviews of the documentation provided by AHS and discussions with AHS staff to verify our understanding of AHS' current Agency Medicaid Enterprise and to ensure the accuracy of our depiction of the business, informational, and technical components. We conducted an analysis to determine gaps between the current environment and a desired MITA-aligned architecture. We also assessed the current environment against the desired future state implementation of an enterprise-wide service-oriented architecture. Based on our previous experience and documentation examples, we worked with AHS to develop and finalize models of the future architecture.

2.3.1 General Approach

The following provides a brief summary of the key steps undertaken to develop the Vermont Medicaid Enterprise Architecture:

Step 1: Described the organizational structure of the Agency of Human Services. Each department within the Agency was then linked to the functions it performs.

Step 2: Compiled Vermont's as-is and to-be Business Architecture models. The existing MITA SS-A was reviewed and modified based upon the information collected during documentation review, meetings, and Visioning Sessions to articulate the future vision of the Business Architecture.

Step 3: Examined the flow of information across the departments within the Agency. The focus of this effort was to identify duplicative processes, identify critical information, and align business processes to technical components.

Step 4: Documented Vermont's as-is Medicaid Technical Architecture by creating an inventory of the state's existing IT assets to identify current systems, applications, and databases. Documented the business applications and technical utilities comprising each system, the databases utilized by each application, and the IT platforms on which they run. Mapped each application to the business processes and capabilities they support.

Step 5: Tailored the MITA Technical Architecture to AHS needs in order to reflect the modifications necessary to allow Vermont to achieve its target level of maturity. Finally, these modifications were validated against Agency-developed Enterprise Architecture planning documents to ensure consistency.

For example, we:

- Mapped each of the State's target capabilities to the specific data architecture elements (e.g., online database, data hubs, and data warehouses), application architecture elements (business applications and services), and Technical Architecture elements (technical services) needed to implement the capability;
- Identified State-specific technical service utilities such as integration with the State's legacy systems, interoperability with partner/agency systems, and data integration and sharing requirements;
- Identified redundant and inconsistent databases, and the new data architecture elements (e.g., data hubs and data warehouses) that are included in the target architecture;
- Defined Vermont's Medicaid technical and data standards based on MITA and previously developed AHS EA planning documents.

2.3.2 Data Collection, Review, and Analysis

A variety of mechanisms were utilized to collect and analyze the information necessary to produce this document. To assess the Business Architecture, the Qualis team collected procedure manuals and various other materials from the State's subject matter experts. This information was utilized to conduct the Business Visioning Sessions. These sessions examined the assumptions of Vermont staff as to what functionality should and should not be included within the MMIS. A session was then conducted for each MITA business area to elicit information about existing workflow processes and operational "pain-points" to identify opportunities for improvement and desired functionality to be addressed in the MMIS procurement.

In assessing the Information Architecture, the Qualis team collected data through the review of documentation and discussions with the Agency IT staff. The main focus of this effort was to identify critical groupings of data and ensure that the future implementation will support the necessary flow of data, regardless of the data's source.

To address the Technical Architecture, the Qualis team reviewed the materials collected and produced throughout the Eligibility (i.e., VIEWS) procurement project, which included the technical application surveys as well as the MITA materials produced. Major sources of documentation reviewed to capture the informational and technical components for the Agency's Medicaid enterprise are listed below.

- Internal Sources
  - Vermont's Health Care Reform – 5-year Implementation Plan
  - AHS IT Strategic Implementation Plan (10-11-09)
  - AHS IT Enterprise Architecture (December 2009)
  - AHS Infrastructure Spreadsheets, which included inventories of applications, servers, etc.

- External Sources
  - Medicaid Information Technology Architecture Framework 2.01
  - The Kansas Information Technology Architecture v11.2
  - Contracted Vendor Infrastructure documentation

The information collected throughout these efforts was analyzed and used to create the architectural depictions presented in the Technical Architecture Analysis section (Section 7). This information formed the basis for the State of Vermont Request for Proposals for a Medicaid Enterprise Solution, published in November 2010.

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Section 3 – Vermont Medicaid Overview

On May 25, 2006, Vermont Governor James Douglas signed into law Acts 190 and 191 (Acts Relating to Health Care Affordability for Vermonters). These Acts provide the foundation for Vermont's Health Care Reform Plan. As one component of addressing the strategic goals of the reform plan, AHS envisions the creation of a "health care enterprise" comprised of modern, responsive, interoperable systems that are integral parts of the AHS Enterprise Architecture. These systems support the vision for information technology with shared services and common technologies that can efficiently and effectively support provision of health care services to Vermonters.

3.1 Agency of Human Services

The State of Vermont performs and supports Medicaid business processes across the entire AHS. AHS is the single State agency responsible to CMS for oversight of the Medicaid Program and administers all Medicaid benefits and services through the Department of Vermont Health Access (DVHA). DVHA has established interdepartmental agreements and/or memoranda of understanding with other AHS departments to accomplish its responsibilities and provide services to its clients. Figure 2 presents a high level structure of AHS and its departments and programs.

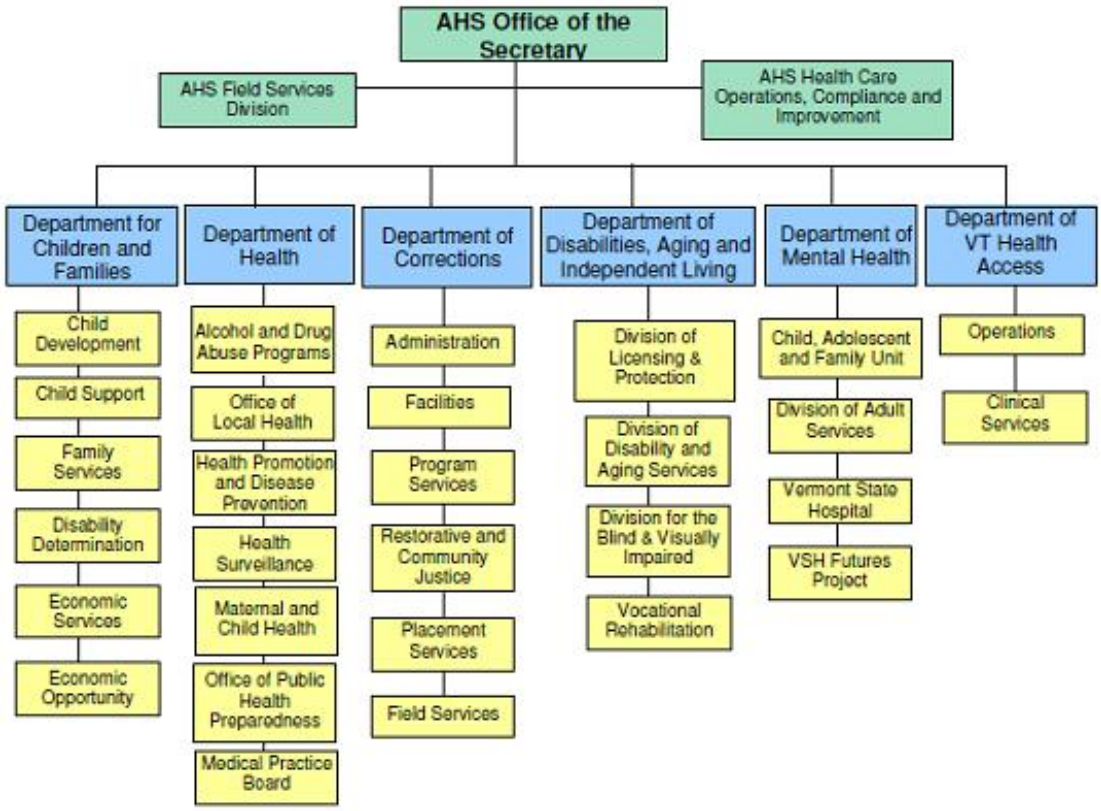


Figure 2: High-level Structure of AHS and its Departments and Programs

AHS manages the Vermont Medicaid program in a unique way through an interagency agreement with DVHA. Under Section 1115 of the Social Security Act, the federal government can waive statutory and regulatory provisions of major health and welfare programs including Medicaid. DVHA, serving as a Public Managed Care Organization under Vermont's Global Commitment to Health Waiver (CMS 1115 waiver), maintains intergovernmental agreements with four other AHS departments, the Vermont Department of Education (DOE) and several major vendor contracts to fulfill its responsibilities. The Department for Children and Families, the Vermont Department of Health (VDH), DAIL, and the Department of Mental Health (DMH) each perform key functions that support the determination of eligibility, program enrollment, and provision of services for Medicaid and other health care benefit program applicants and beneficiaries.

For example, the Medicaid School Based Health Services Program is used by the State to generate Medicaid reimbursement for medically related services provided in accordance with an Individual Education Plan (IEP). Schools bill Medicaid directly for services and receive a monthly grant award from the Department of Education based on the claims submission to Medicaid.

3.2 AHS Functional Services

The key human services delivery elements in Vermont include the functional areas in the following table.

Functional Area	Description
Intake	Registering an individual and capturing the information presented for use in determining eligibility or in connection with benefits for a specific program.
Certification and Verification	Manage the certification/verification process when eligibility requires an applicant to be certified by an outside source as meeting certain conditions for a specified time.
Identity Management	AHS view of a person (client, provider, etc.) including demographics, services, links to related individuals or other benefit units they are part of (family, household), etc.
Eligibility Determination	Program-specific algorithm that determines an applicant's eligibility.
Benefit Assignment and Delivery	Calculation of what entitled applicants are eligible to receive and delivery of benefits (either financial or services).
Social Services Delivery	Services aimed at ensuring continuity of housing, food, fuel, etc. Creation of service schedules.
Financial Management/ Payment Processing	Case- and program-related financial processing for each service delivery and for each participant type. Creation and maintenance of financial schedules and transactions for program-related payments and deductions.
Health Services Delivery	Personal, public, and population-based health services.

Functional Area	Description
Outcomes Measurement	Ongoing assessment and measurement of whether the intended outcome or disposition of a case was achieved, as well as the planning of any required follow-up or case maintenance.
Appeals Management	Management of the appeals process, scheduling, and resources required for the appeal process when an applicant disagrees with an agency decision.
Collections and Overpayments Processing	Tracking and management of receivables and collection activities if an overpayment is made in a case.
Outreach and Notifications	Activities for communicating to current clients about changes in policies, benefits, availability of resources, etc.
Resource and Services Management	Determination of internal/external resources available to participate in a case (name, capability, number of "slots" available, rates, contact information, scheduling, and assignment of resources to beneficiaries.
Institutional Services	Activities required to run "brick and mortar" facilities (e.g., Vermont State Hospital, Department of Corrections)
Provider Management	Information about providers (including state employees), contract information, and shared functionality with external parties such as service suppliers, product providers, and employers.

Table 1: AHS Key Functional Areas

Note: Table 1 is adapted from Strategic Technology Map for Government Human Services Agencies (Gartner Industry Research #G00149643, 23 July 2007).

In the context of this functionality, the following diagram (Figure 3) shows the relationships (not necessarily information flows) among the functional areas common to many AHS programs and organizations.

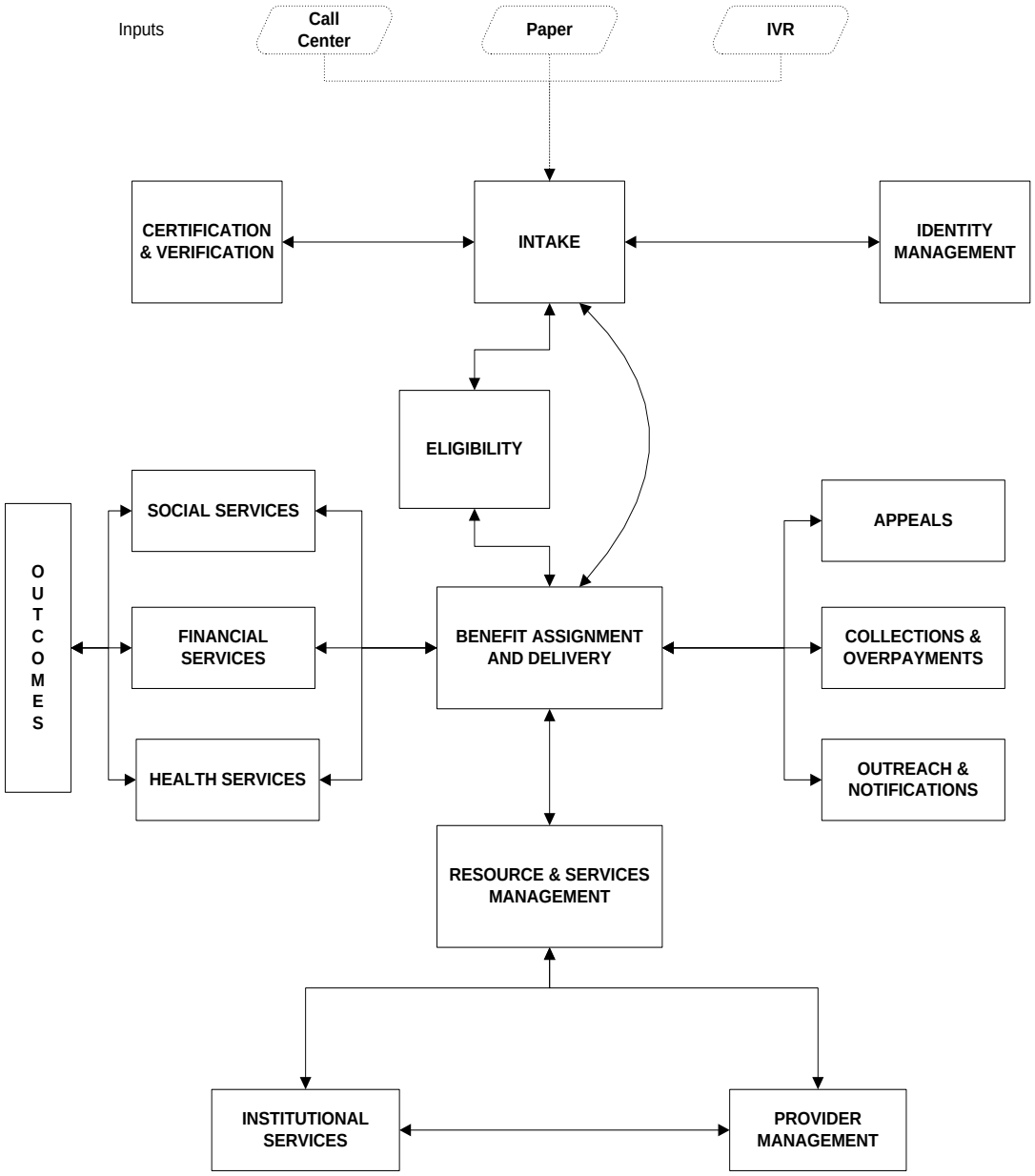


Figure 3: AHS Functional Areas, Common Programs, and Organizations

3.3 Department of Vermont Health Access

DVHA administers most of the publicly funded health care programs for the State of Vermont. The majority of funding is through Medicaid and is authorized under two Centers for Medicare and Medicaid Services approved 1115 Demonstration waivers. Several finance streams are outside the waiver programs, including information technology enhancements, Disproportionate Share Hospital (DSH) payment, and the Children's Health Insurance Program (CHIP) services. In addition, DVHA administers the State's health care reform efforts including health information technology (HIT) activities in Vermont, and Blueprint for Health.

DVHA serves as the Public Managed Care Organization for all enrollees under Vermont's Global Commitment to Health Waiver. Because of the Interagency Agreement (IGA) between AHS and DVHA, and the subsequent MOUs between DVHA and other departments within AHS, actual administration of the program is quite broad and occurs within all of the departments included in AHS with the exception of the Department of Corrections. DVHA administers the Medicaid program through MOUs with the following AHS departments:

- Department for Children and Families
- Vermont Department of Health
- Department of Disabilities, Aging and Independent Living
- Department of Mental Health

DVHA is responsible for the management of Medicaid, the State Children's Health Insurance Program (SCHIP), and other publicly funded health insurance programs in Vermont. DVHA is the largest insurer in Vermont in terms of dollars spent and the second largest insurer in terms of covered lives. DVHA performs its duties in a dynamic and demanding environment where the mission is to:

- Assist beneficiaries in accessing clinically appropriate health services.
- Administer Vermont's public health insurance system efficiently and effectively.
- Collaborate with other health care system entities in bringing evidence based practices to Medicaid beneficiaries.

Vermont is unique in that the Medicaid Program is operated under two waivers; Global Commitment to Health and Choices for Care.

Global Commitment to Health – In 2005, the State received approval from CMS for a Section 1115 Medicaid waiver known as the "Global Commitment to Health." The five-year waiver term began in October 2005 and allowed the State to fundamentally restructure the Medicaid program using public health and Medicaid managed care models and imposed a multi-year aggregate cap on the amount of federal funding available for acute care services for the Medicaid population. The State exchanged the risk of operating under a capped funding arrangement for the opportunity to maintain and

expand the populations served in Vermont, and use more flexible and non-traditional approaches to service delivery, payment, and financial models in the Medicaid program. Through this waiver, DVHA operates using a managed care model and adheres to the Medicaid Managed Care regulations for global commitment operations, while maintaining a more traditional state Medicaid unit role for Choices for Care, CHIP, and DSH operations. The goals of the demonstration are to:

- Increase access to health care for Vermonters
- Contain costs
- Maintain and improve the quality of health care

Vermont designed this program to put in place a series of health coverage options to achieve the State's goal of universal access to health care, while providing the flexibility necessary to administer its publicly supported health care programs in a member-centered and fiscally sustainable manner. The waiver allows the State to deviate from traditional federal Medicaid law and regulations in the following key ways:

- Imposes a global cap on federal funds.
- Establishes the State as a managed care organization.
- Allows the State to use federal Medicaid funds for state fiscal relief and non-Medicaid health programs.
- Provides flexibility to reduce benefits, increase cost sharing, and limit enrollment for optional and expansion populations with some limits.

The State of Vermont is currently in the process of renewing the waiver to continue the current operations in the same manner. At the same time, the State will be preparing for a transition to the requirements in the Affordable Care Act (ACA)

Choices for Care – This 1115a Long Term Care Medicaid waiver program encompasses all of the State's long-term care Medicaid services for elderly or physically disabled Vermont adults. The premise of the waiver is choice and access, providing beneficiaries with equal access to either nursing facility care or home and community-based services, consistent with their choice. The program wraps an individualized package of community supports around a person in their home, assists people with everyday activities at home, and funds enhanced residential care or nursing facility care as needed. Providers include a network of private non-profit entities such as Adult Day Centers, Area Agencies on Aging, Assisted Living Residences, Home Health Agencies, Nursing Facilities, and Residential Care Homes.

Programs and clinical operations are managed by DAIL, while DVHA processes claims, extraordinary relief, and other payments authorized by DAIL under the Choices for Care program.

3.4 As-Is Vermont Medicaid Environment

The unique organizational structure in Vermont results in many of the same business processes being performed in multiple departments. Each department performs processes specific to its client base or programs often using siloed, disparate systems to execute those processes. Departmental procedures and practices support frequent communication that facilitates coordination between and among departments, typically through the use of manual methods such as meetings and telephone conversations. Use of e-mail is also common. However, it is important to note that in most instances systems are not used across the departments to support similar functions and in many cases desktop applications like Microsoft Excel spreadsheets and Microsoft Access databases are used to support the functions.

For example, DVHA has automated a number of the processes contained within the Care Management and Operations Management business areas through the use of support systems such as CareConnection for Care Management processes and the MMIS for Operations Management processes. DCF has automated many of the processes contained within the Member Management business area. For example, the Enroll Member process is enabled by the ACCESS system – automatically and simultaneously enrolling a beneficiary in all programs for which he or she is eligible. DMH uses its Management Reporting System (MRS) to track specific clinical and service data about individuals enrolled in the CRT program. DAIL utilizes its SAMS™ system to track similar data for Choices for Care members. VDH has access to both the ACCESS and the MMIS systems to perform numerous processes such as those related to authorization for dental care and HIV/Aids specific services.

The State is leveraging the multi-disciplinary approach and program flexibility inherent in the Global Commitment to Health Waiver to implement a chronic care management program for Medicaid beneficiaries. The Vermont Chronic Care Initiative (VCCI) is a care coordination and management program to improve the health outcomes of Medicaid beneficiaries by addressing the increasing prevalence of chronic illness in the Medicaid population. The VCCI exemplifies the Chronic Care Model in action and emphasizes evidence-based, planned, integrated, and collaborative care for beneficiaries who exhibit high-prevalence chronic disease states, high expense, and utilization. The VCCI is comprised of two components that work interchangeably: 1) eighteen DVHA care coordinators working in specific regions of the State to provide direct support to Medicaid beneficiaries with complex needs and coordinate closely with the primary care providers; and 2) a contract with APS Healthcare Midwest, a subsidiary of APS Healthcare, Inc., to provide primarily telephonic support to identified beneficiaries with less intensive needs.

The Vermont Blueprint for Health is a vision, a plan, and a statewide partnership pilot project to improve health and the health care system for Vermonters. The Blueprint provides the information, tools, and support that Vermonters with chronic conditions need to manage their own health as well as information that doctors need to keep their patients healthy. The Blueprint is working to change health care to a system focused on

preventing illness and complications, rather than reacting to health emergencies.

One goal of the Blueprint is that Vermont will have a Chronic Care Information System (CCIS) that supports statewide implementation of the Blueprint for both individual and population-based care management. The Blueprint has entered into agreements with the Vermont Information Technology Leaders (VITL) for data services and with DocSite for the medical disease registry to provide access to information for physician's offices statewide. Populating the registry automatically with clinical data available in electronic format is essential to provider participation and use. Health plan data is essential to ensure completeness and accuracy of the information in the registry and evaluate Blueprint outcomes. It is expected that data from the MES will be exchanged with Blueprint.

Over 50 percent of the Medicaid program funds are administered through programs in departments outside of DVHA. These include, but are not limited to behavioral, mental health, and skilled nursing services for children and families, services for individuals with developmental disabilities, serious and persistent mental illness, substance abuse services, and early periodic screening, diagnosis and treatment (EPSDT) administrative claims. In addition, DCF processes the eligibility for all health care benefits.

The following diagram (Figure 4) presents a high-level depiction of the numerous applications and vendors utilized to support the Agency's Medicaid operations.

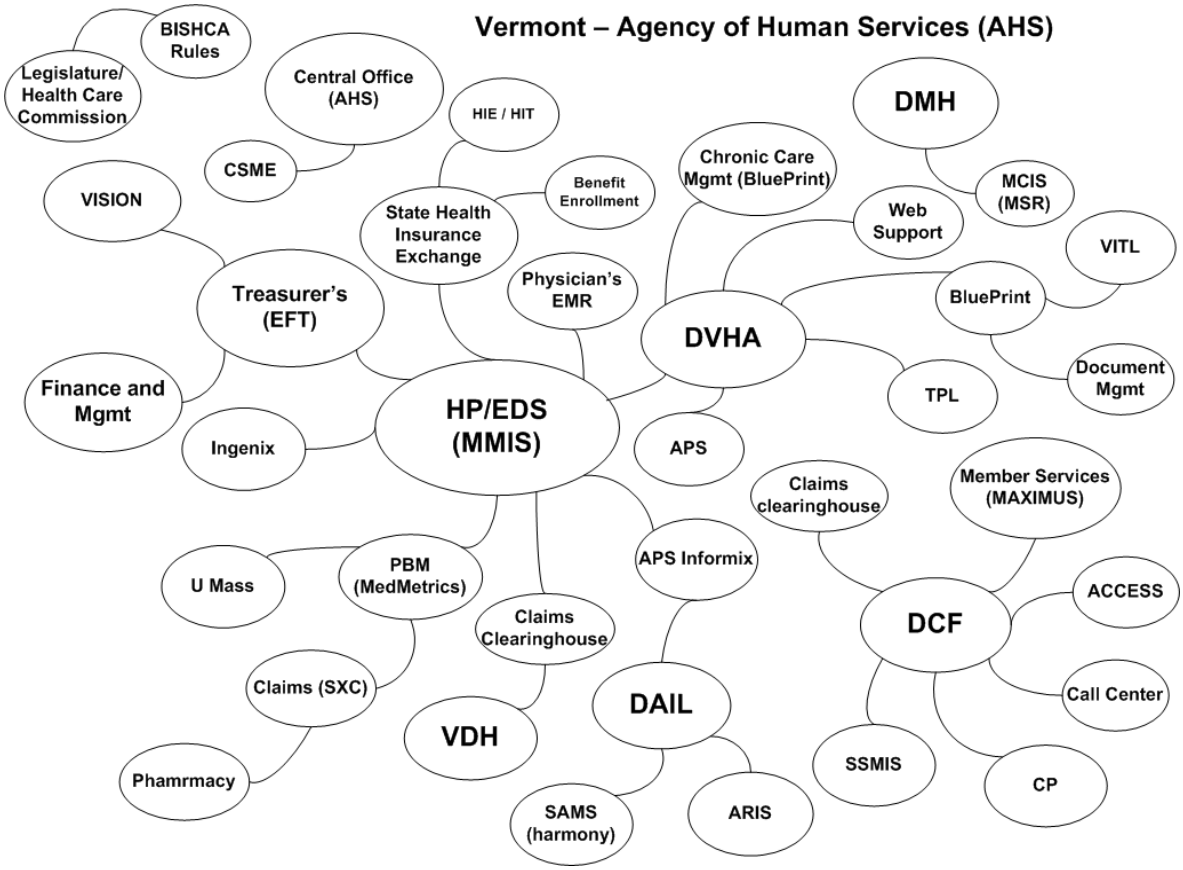


Figure 4: High-level Depiction of the Numerous Applications and Vendors

The diagram illustrates the current environment and presents a picture of siloed implementations of automation throughout the Agency. In many cases, one department may have focused on technology and automation, while a sister department performs the same processes manually. Key programs and initiatives influencing and impacting these organizational and system relationships are presented in the table below, along with a brief description of each.

Programs and Initiatives	Description
MMIS Fiscal Agent Service (Hewlett-Packard)	DVHA currently has a Fiscal Agent contract with Hewlett-Packard through December 2012 to operate and maintain the State's MMIS (i.e. claims processing, reference, provider, fiscal management, and reporting subsystems) along with responsibility for Health Insurance Portability and Accountability Act (HIPAA) transaction standards, system maintenance, and designing and implementing modifications and enhancements. In 2001, the processing of pharmacy claims was transferred to the Pharmacy Benefit Management (PBM) vendor. The PBM vendor sends drug transactions records to Vermont's Fiscal Agent for processing payments to pharmacy providers. The current MMIS has been modified to accommodate changes in federal eligibility and program coverage, claims processing and reporting requirements, and changes in the State regulations.
Member Services (MAXIMUS)	DVHA contracts with MAXIMUS for member services. Since 1995, the DVHA and MAXIMUS have collaborated to develop work plans, policies, procedures and systems to provide outreach, enrollment activities, and member services to Medicaid beneficiaries. MAXIMUS provides helpline operations, outreach and education to potential enrollees, and assistance to those inquiring about Medicaid health programs.
Pharmacy Benefit Manager (MedMetrics)	DVHA contracts with the PBM, MedMetrics Health Partners. The PBM has established a RetroDUR (Retrospective Drug Utilization Review) Program. This program provides information to DVHA which assists in the identification of patterns of inappropriate prescribing and/or medication use, alerts physicians to potential drug therapy problems and makes recommendations to avoid drug therapy problems. The goal of the Vermont Medicaid RetroDUR Program is to promote appropriate prescribing and use of medications and is the shared responsibility of the MedMetrics Health Partners and the Vermont DUR Board. Monthly, specific drug classes are targeted for review under the program.
Medicaid Chronic Care Management and Care Coordination Programs/ APS Healthcare Midwest	The State is using the flexibility possible through the Global Commitment to Health Waiver to integrate a Chronic Care Management Program (CCMP) into a system of care that can be used to benefit Medicaid beneficiaries, providers, and DVHA. The purpose of the CCMP is to improve health outcomes and reduce costs for Medicaid beneficiaries with chronic health conditions. DVHA's Care Coordination (CC) Program is a specialized program included under DVHA's CCMP umbrella. DVHA's CC Program is

Programs and Initiatives	Description
	designed to integrate a specified plan of care implemented by a variety of service providers and programs under the direction of a designated professional employed by DVHA. Care Coordination teams assigned by county collaborate with the local hospital emergency departments, primary care providers and community agencies to facilitate the care plan process. The State has procured the services of the University of Massachusetts Medical School Center for Health and Policy Research for population selection and program monitoring for the State's Medicaid Chronic Care Management Program, including the Care Coordination program.
Vermont BluePrint for Health (BluePrint)	Under Act 191, the Legislature endorsed the "Blueprint for Health" chronic condition prevention and management initiative, which includes all Vermont health care payers including Vermont Medicaid, as the foundation for CCM Programs and Care Coordination. The "Blueprint for Health" is the State's plan for chronic care infrastructure, prevention of chronic conditions, and chronic care management program, and includes an integrated approach to patient self-management, community development, health care system, and professional practice change, and information technology initiatives. One goal of the Blueprint is that Vermont will have a Chronic Care Information System that supports statewide implementation of the Blueprint for both individual and population-based care management. The Blueprint has entered into agreements with the Vermont Information Technology Leaders for data services and with DocSite for the chronic disease registry to be deployed to physician's offices statewide. Populating the registry automatically with data available in electronic format is essential to provider participation and use. Health plan data is essential to ensure completeness and accuracy of the information in the registry and evaluate Blueprint outcomes.
Vermont Information Technology Leaders (VITL)	A non-profit organization called Vermont Information Technology Leaders is the state's Regional Health Information Organization (RHIO). It is in the process of establishing the state's health information exchange network and is also charged with the development of Vermont's Health Information Technology Plan. DVHA is an active participant in VITL efforts and the creation of the state plan. Information on the statute authorizing VITL, its organization, and its activities can be found at: http://vitl.net
Vermont Health Care Reform	Vermont is proactive in its attempts to improve health care in the State. Its Health Care Reform Five-Year Implementation Plan was submitted to the Governor and Legislature on December 1, 2006. Its three goals are: • Increase access to affordable health insurance for all Vermonters; • Improve quality of care across Vermonters' life spans; and • Contain health care costs. This plan can be accessed at http://hcr.vermont.gov

Table 2: AHS Existing Programs and Initiatives with Brief Descriptions

3.5 Evolving Vermont Medicaid Enterprise Environment

AHS is working towards its health care enterprise vision that will be comprised of modern, responsive, interoperable systems that support shared services and common technologies. The health care enterprise is part of a larger IT framework and is designed to leverage the health information exchange being created by the Vermont Information Technology Leaders initiative, which conforms to the Vermont Health Care Technology Strategic Plan, the Blueprint for Health, the Vermont Health Care Reform Five-Year Plan, and the Agency's IT Strategic Plan.

In addition to the specific Medicaid-system projects, AHS and its various departments are undertaking a number of technology and business projects which will result in significant changes to its information technology infrastructure and architecture. AHS has been scoping and defining Enterprise Architecture in the Agency to ensure future growth and efficiency needs are met. The Department for Children and Families, which is responsible for processing Medicaid eligibility determination, is involved in two related projects: Economic Services Division Modernization (ESDM), which will reinvent many of its business processes; and Strategic Transformation of Enterprise for Effective Realignment, which will implement technology improvements such as imaging and call center functionality.

Vermont also shares the basic goals of the Medicaid Information Technology Architecture and is using MITA as the basis to design new systems, develop new business processes, and create requirements for a new MMIS.

3.6 Future Vermont Medicaid Enterprise Environment

The State of Vermont is expanding its vision of the Medicaid enterprise beyond the scope of a traditional MMIS. That is why the new system being procured is referred to as the Medicaid Enterprise Solution. The Agency has taken steps to realize this vision by drafting an Enterprise Architecture Analysis and by issuing an RFP for the procurement of SOA components.

This Enterprise Architecture Analysis represents a starting point from which a comprehensive, sophisticated plan to support the new Agency architecture based upon the concepts of SOA will evolve. This plan will encompass the entire EA of the Agency, which includes the architecture necessary to support the Medicaid enterprise.

AHS is currently procuring SOA components that will be implemented within the next few months and expects that the MES will interoperate with, if not utilize, these components. These components are anticipated to be purchased from a major vendor. Currently IBM, Oracle, and Software AG/Microsoft have bid. The State anticipates selecting products from one of these vendors as the primary SOA vendor. The Agency is in the process of transforming its Medicaid operations into a service-oriented enterprise structure. The State has traversed part of the journey towards a service-oriented

enterprise structure and has identified several business functions and systems as core components of the new EA. The MES will be a critical component of that architecture and must be compatible with the SOA environment. Table 3 describes the business functionality marked for enhancement through the RFP.

Business Function	Description	Exposed Functionality
Call Center	Interactive Intelligence is in place in DCF and is configured for a major call center that supports economic services for children's and families. This system was expanded as a statewide government solution that was supported and sponsored by the Department of Information and Innovation (DII). This system was funded by both state and federal dollars.	• Integrated Voice Recognition (IVR) • Integrated Facsimile (FAX) • Call Routing
Data Warehouse	CSME is in place and contains eligibility, enrollment data, case data, and a limited set of claims data. This is the Agency's official data warehouse and will require data from the new MMIS.	This system will need to receive data from the new MMIS.

Table 3: Existing Business Functionality to be Exposed for MMIS Use

In addition to the foundational components identified above, AHS is in the process of selecting and implementing additional EA components. These additional elements of the EA foundation are identified in Table 4. The Agency intends to select vendor(s) and specific product(s) by the second quarter of 2011, which will allow the technical specifications for these components to be shared with the selected MMIS vendor.

Business Function	Description	Exposed Functionality
Document Management System	Onbase by Hyland Software is the current document imaging and document workflow solution. This solution is identified as SOA compliant but the scope will need to be expanded to accommodate the new MMIS.	• Document Imaging • Document Management • Document Workflow
Care Management	This functionality is currently performed by DocSite within the scope of Vermont's Blueprint for Health.	• Care Management Registry
Enterprise Architecture and Services	EA services, deemed infrastructure components, are currently documented in the advanced planning stage. The Request for Proposal (RFP) for these components was published in the third quarter of 2010. The target for implementation of these components is the second quarter of 2011.	• Transformation and Translation Services (Hub) • Enterprise Services Bus • Workflow Management and Orchestration • Electronic Master Provider and Person Index • Identity Management

Table 4: Systems in Planning Stage to be Leveraged by the MMIS Vendor

The unique organizational structure of the Agency, resulting in many of the same processes currently being performed in multiple departments, presents numerous challenges for the Agency as it works to achieve its modernization goals. Departments perform processes specific to its client-base or programs, often using siloed, disparate systems to execute those processes. To generate operational efficiencies, improved information sharing, and enhanced services, the Agency must address its operating model to fully utilize automated functionality such as:

- Tightly integrated systems across departments and programs (e.g., automated, standardized exchange of data);
- Web portals providing access mechanisms not only for AHS/DVHA but other internal and external stakeholders such as members, providers, contractors, and vendors;
- Robust imaging, document indexing, and management capabilities;
- Workflow engines that support workflow and workload management, monitoring, and reporting;
- Rules-engines that facilitate rapid changes that can be made by "super-users" and require limited technical support;
- Predictive modeling and statistical tools for reporting, trending, and analysis; and
- Dashboards and other business-user driven reporting functionality.

A primary objective of AHS is to work toward integrating systems and processes across departments in an effort to streamline workflow, leverage resources, and achieve economies of scale. To this end, the Agency envisions an Enterprise Architecture that is adaptable, expandable, and flexible. Figure 5 depicts a high-level representation of such architecture.

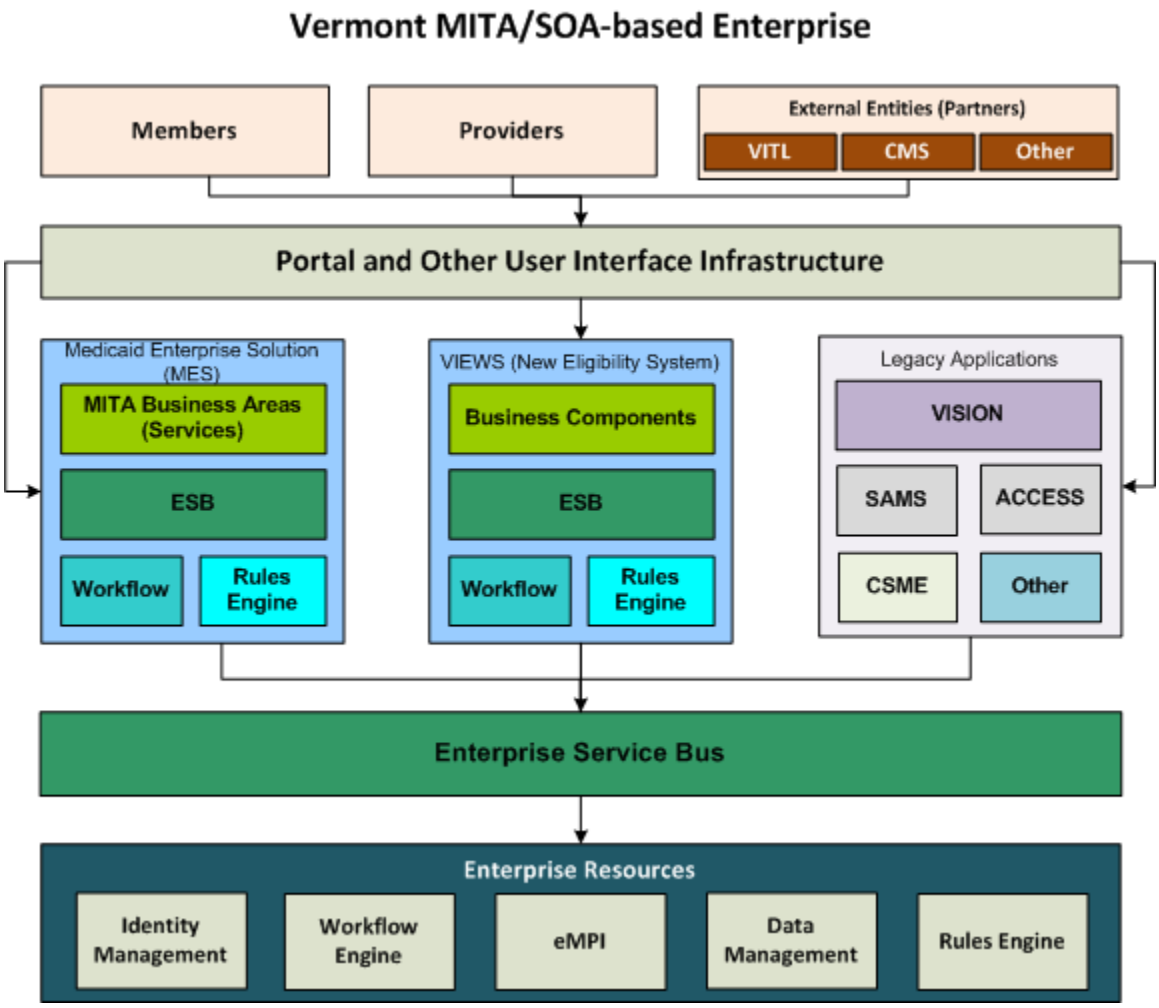


Figure 5: High-level Representation of Future Agency Medicaid Enterprise Architecture

Any newly implemented technology and/or service solution must be built upon the foundational components already procured and put in place by the Agency, and must comply with the Agency's requirements for a robust and interoperable solution.

Section 4 – EA Analysis Overview and Framework

With the background and organization of AHS defined and documented, the following sections present an analysis of the current and evolving Agency enterprise business functions, applications, and technologies, as well as possible future architectures for each. The findings and conclusions are presented within the constructs of the CMS MITA Framework.

Several key activities were conducted in the preparation of this analysis. These activities included:

- Analyzing AHS existing systems documentation;
- Interviewing State IT staff to supplement project understanding of system operations;
- Identifying current system strengths and weaknesses; and
- Documenting the ways in which systems share and use data across AHS programs.

Major inputs for the analysis included State IT systems documentation and information gathered during facilitated meetings with key Agency personnel. The following documents provided the technical background necessary for assessing the current Enterprise Architecture:

- Requirements as defined within the RFP
- Federal rules and regulations pertaining to MMIS
- Latest version of the MITA Framework initiative document
- CMS regulations and Certification Checklist
- Internal/external data sources and external interface mechanisms
- Documents prepared as part of Vermont's eligibility procurement project (formerly the Modernization of Vermont Enterprise – MOVE)
- AHS/DVHA technology standards
- AHS EA planning documents
- Strategic plans
- Definition and status of any other major projects currently under way within VT MMIS
- IT Governance and other AHS policy
- IT Assessment documents
- Technical plan and architecture to achieve HIT/HIE goals

Meetings and interviews were conducted with key State personnel involved in supporting Medicaid operations to review and discuss current IT systems and business processes.

These interviews explored the following topics:

- MMIS characteristics and issues
- Additional applications used to support Medicaid processes
- Current and planned platforms, architectures, and application changes
- The State IT environment and Enterprise Architecture plans
- Current and planned Agency Governance structures
- Processes by which business needs are communicated to IT groups

The result of this analysis is a description of the Agency's current IT systems that support existing business operations along with analysis that indicates how they currently support MITA business processes. The results of the document review and subsequent analysis provide a clear picture of the current Enterprise Architecture. It also provided a strategic vision for the Agency and presented a target for the future architecture of the enterprise.

The following sections present the current states and projected future states for the Business, Information, and Technical Architectures aligned with the MITA Framework. Each of the following sections is organized in a similar fashion, as follows:

- Overview or introduction of the section
- Analysis of the as-is or current environment
- Analysis of the evolving environment
- Analysis of the future environment

The Business Architecture section is structure somewhat differently, in that it provides the analysis of the as-is, evolving, and future environments within the context of a specific MITA business area.

Section 5 – Business Architecture Analysis

This section examines the Medicaid services provided by the various departments within the Agency. Each of the following sub-sections presents a MITA business area, examines the current business operations of this area, discusses what is and what is not working within the existing business area, and describes the desired functionality of the new MES.

5.1 Overview

Vermont's existing health care operation processes are not directly aligned to the MITA Framework; however, the transition to the MITA Framework and achievement of MITA Level 3 is the aim of AHS. Therefore, for the purposes of this analysis, this section is organized around the eight business areas and 79 business processes, as shown below in the MITA Business Process Model.

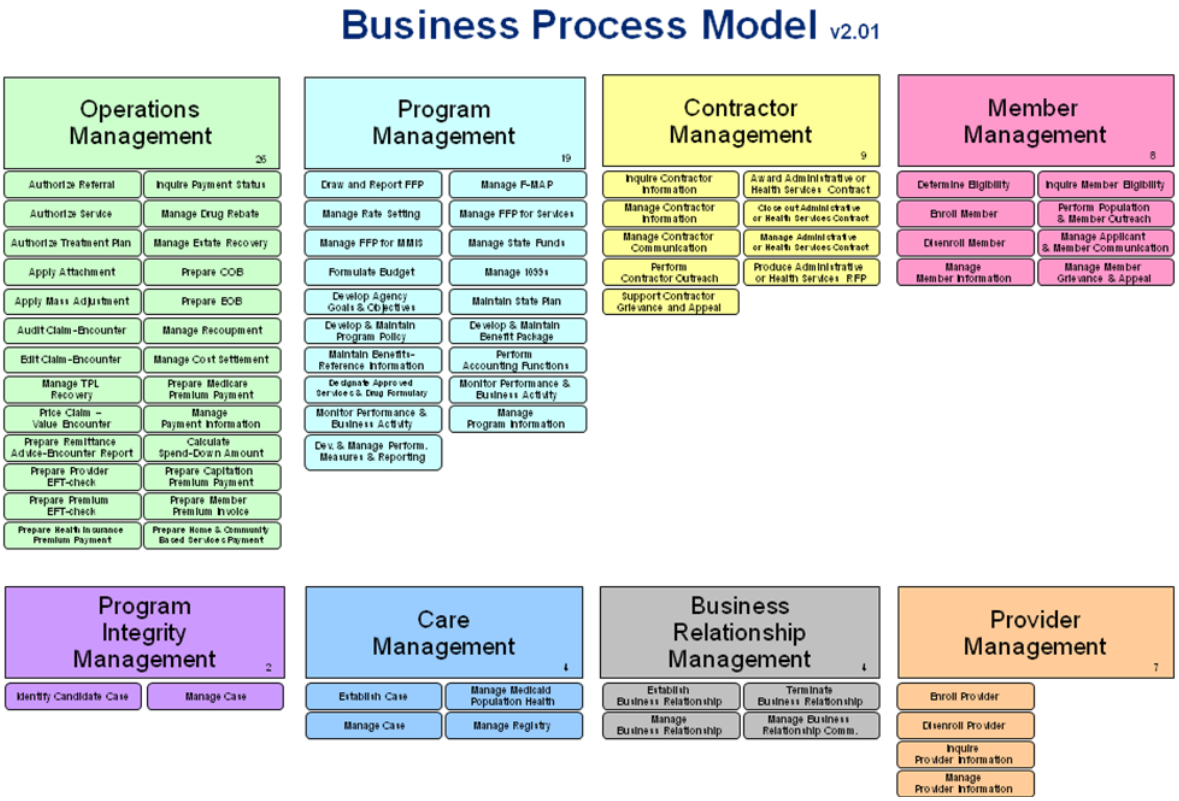


Figure 6: MITA v2.01 Business Process and Areas

Each business area subsection contains information pertaining to the as-is, evolving, and future states of the Agency's business environment.

- **As-Is** – The subsections devoted to the as-is state describe the current mode of operations by examining the business, information, and technology aspects of the MITA business area.

- **Evolving** – The evolving state subsections describe the improvements underway to address the initiatives within the Agency, such as Health Care Reform and "Challenges for Change."
- **Future** – The future state subsections sections present a vision of the goals that will be realized with the implementation of a new MES. While the as-is and evolving state subsections present information for the MITA business area, the future state subsection section provides greater detail for the MITA business processes.

The business processes described in these subsections contain details representing a cross-section of the functional capabilities expected of future vendor solutions. These business processes are not intended to signify the most complex or critical functional aspects of the Agency, but do show the level of detail and the combination of business and technical services expected of potential vendors.

Each of the eight MITA business areas and the representative sample business processes for those areas are provided in the subsections as listed below.

Subsection	Business Process Area	Sample Business Process/Service
5.2	Business Relationship Management	• Establish Business Relationship
5.3	Care Management	• Manage Case
5.4	Contractor Management	• Inquire Contractor Information
5.5	Member Management	• Inquire Member Eligibility
5.6	Operations Management	• Service Authorization/Authorize Service • Prepare EOB • Audit Claim/Encounter
5.7	Program Integrity Management	• Identify Candidate Case • Manage Case
5.8	Program Management	• Develop and Maintain Benefit Package
5.9	Provider Management	• Inquire Provider Information • Manage Provider Information

Table 5: MITA Business Areas & Business Processes

The future state description includes diagrams to illustrate possible implementation alternatives for achieving the vision of AHS. These diagrams were derived from various sources of information, specifically pertaining to the Vermont needs and desires, as well as to the guidelines presented within the MITA Framework. The subsections that follow provide a brief description of the sample business process, SS-A gap analysis for the business process, MITA guidelines, and future-state flow diagrams with documented process steps.

The future state depictions presented in these sections are not meant to be prescriptive; rather, the intention is to provide diagrams and graphics that illustrate the requirements

outlined in the MES RFP. The methodology utilized to create the flow diagrams (Figure 7) is depicted in the following diagram.

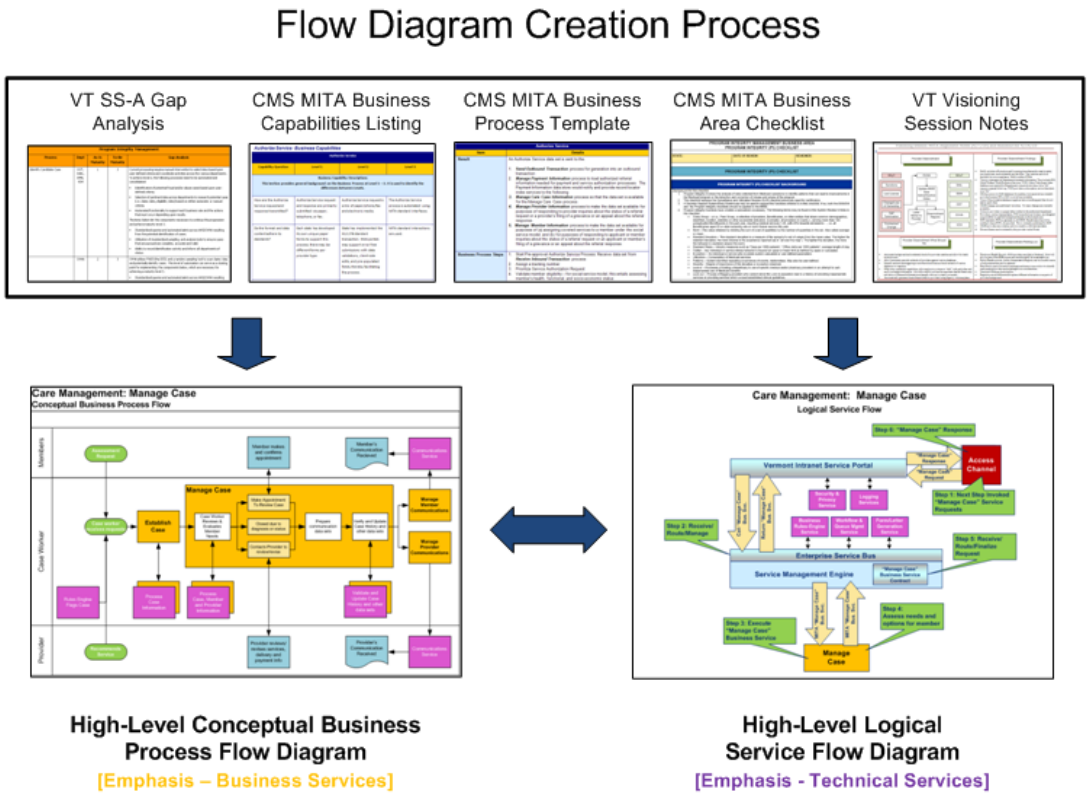


Figure 7: Business Flow Diagram Creation Process

Each diagram demonstrates MITA-aligned business processes, reflecting a MITA maturity level of three or more. The diagrams illustrate interoperable and plug-and-play capabilities consistent with MITA business services maturity goals. For purposes of the future state depictions, at least one future state business process is provided as a conceptual example to demonstrate possibilities of how a MITA-aligned environment might be achieved.

The subsections also include a brief, high-level discussion of the Information Architecture and Technical Architectures for each business area. Details regarding the Information and Technical Architectures are presented in the following sections (Section 6 – Information Architecture Analysis and Section 7 – Technical Architecture Analysis).

5.2 Business Relationship Management

The Business Relationship Management (BR) area owns the standards for operations between and among the parties in the Medicaid enterprise for exchanges of data and information. It contains business processes that have a common purpose: They are to:

- Establish a clear agreement between and among the parties involved;
- Identify the types of information to be exchanged or shared;
- Identify security and privacy requirements;
- Define communication protocol; and
- Manage the transfer of information.

5.2.1 As-Is Analysis

BR As-Is Business Environment

Within AHS services are delivered by several different departments with DVHA taking lead on the administration of the Medicaid Managed Care programs. Currently, business relationship activities are performed by each department within AHS and are largely a manual process utilizing MS Office tools and guided by the initiating department or the Agency and by state and federal laws on consumer privacy and security. In Vermont the Consumer Information Privacy Standard (CIPS) is currently being developed. Agreements also exist between Agencies, such as, the Department of Education and between and among various trading partners where data and information is exchanged. Currently these agreements are managed via Memorandums of Understanding (MOUs), Inter-Governmental Agreements (IGAs), Department Understanding Agreements (DUAs), and HIPAA-required Trading Partner agreements.

Currently, there is no standardized system in place to support this function across the Agency. As a result, there is little guidance on which type of agreement is most appropriate for execution in each situation. Additionally, standardized text and the data repository for the maintenance of these agreements are inconsistent. Requirements are met, but the process is more difficult than it needs to be. Typical current processes include:

- Identification of the need to execute a data exchange
- Identification of the department(s), agency, or other parties involved
- Identification of the department, agency, and/or person responsible for drafting the agreement
- Preparation of a document
- Possible legal review of content
- Execution of signatures
- Maintenance of the agreements

BR As-Is Information Environment

Currently, the information necessary to manage business relationships is stored in disparate systems, as indicated in Figure 8. There is no mechanism in place to automatically share or centralize this data.

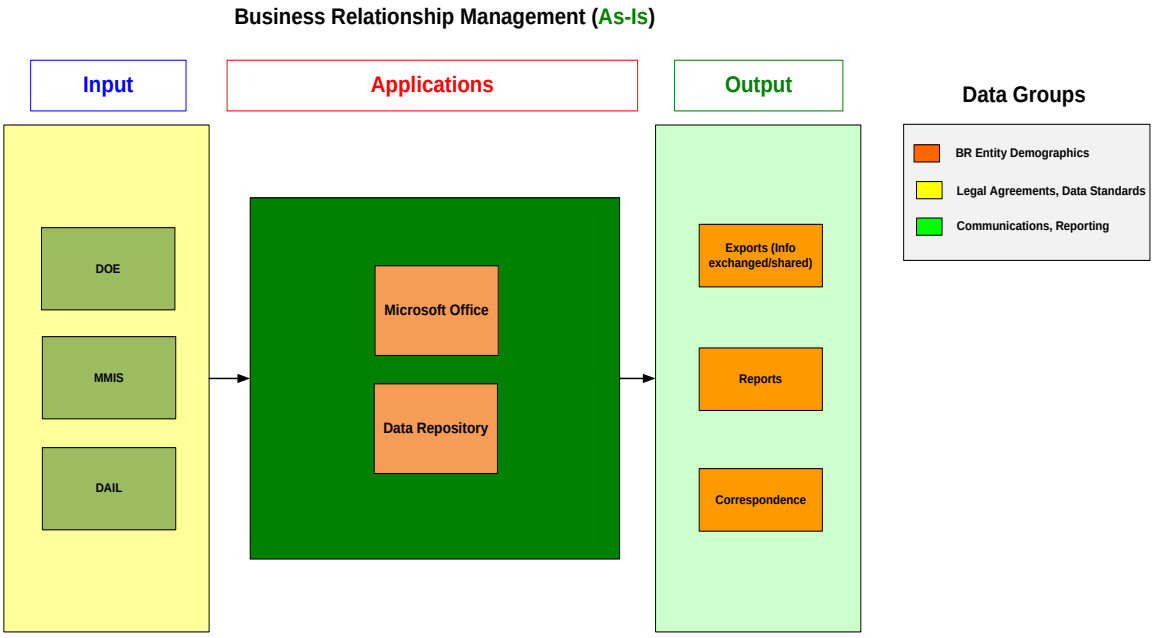


Figure 8: Business Relationship Management (As-Is)

BR As-Is Technical Environment

Business Relationship Management activities in the as-is environment are currently characterized as labor intensive, manual processes utilizing MS Office business tools. Capture and maintenance of documents is a combination of electronic files, paper amendments, attachments, and final documents containing original signatures.

5.2.2 Evolving Analysis

The availability of improved processes and data management will increase productivity and reduce costs with the new MES. The evolving MES solution will be built on the principles and products of SOA with best-of-breed technologies, loosely coupled services, and significant reuse to provide for various needs. The best-of-breed technologies are identified in Section 7 – Technical Architecture Analysis and are outlined in the "Service-Oriented Infrastructure Components RFP v5.0." For example, the intention is to purchase and install one eMPI and one imaging solution that will be configured for wide utilization across agency functional areas. A division or program will conduct a business process analysis, and if imaging and unique identification of individuals are required, the tools already purchased and installed will be used as part of the IT enabling solution.

The evolving environment is intended to describe current or "in-play" modifications or changes in the business, information, or technical environments. Evolving will be presented, when applicable, as major developments of new processes or systems that support or represent bridges from the current as-is state to the desired future MITA/SOA environment.

BR Evolving Business Environment

Methods for improving the Business Relationship Management environment are continually examined. This environment is not currently undergoing any major system enhancements or improvements. However, as Vermont continues to implement innovative health care reform and begins to realize the benefits of a MITA/SOA aligned environment, major enhancements and opportunities will be available.

Table 6 is an extract from the MITA SS-A. It documents the maturity levels associated with the current and future vision of the sample business process (Establish Business Relationship) for the Vermont Medicaid enterprise. It identifies the departments that perform this business process and provides the associated gap analysis for the process.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Establish Business Relationship			
DCF, DAIL, DMH, DVHA, VDH	1	3	The Establish Business Relationship process is primarily performed manually across the departments within AHS. There are some standardized pieces of general information that are included in each Memorandum of Under-standing (MOU) or subcontract based on the Interagency Agreement between AHS and DVHA; the specific details and contents of these agreements are supplied by the initiating department. To achieve a maturity level of 3, the following needs to be implemented: • Standardized, consolidated repository across all departments within AHS that will store all information related to interagency agreements and subcontracts and/or memoranda of understanding between DVHA and AHS, and DVHA and other AHS departments supporting the Medicaid enterprise. • Automated mechanisms to scan all documents and amendments with linkages of the images accessible from the repository. • Standardized automated templates that contain terms and conditions that must be included by regulation yet support variation in scopes of work and performance requirements.

Table 6: Business Relationship Management Gap Analysis

BR Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and extend the information model required to properly address the relationships and services of the many partner and agency relationships critical to the effective delivery of services, as part of the Business Relationship Management business area. There will be evolving solutions that may be proposed as interim solutions on the roadmap to achieving at least the functionality included within MITA's maturity level 3. These solutions will be evaluated by the State for consideration and/or implementation.

BR Evolving Technical Environment

The number of technical capabilities will increase drastically given the various service-oriented infrastructure components that will comprise the Agency's Enterprise Architecture. Given the trend for technical services to enable the set of Medicaid business processes, the state of the art application suites being proposed will allow a great amount of flexibility for the implementation team(s) involved. For instance, current Enterprise Service Bus products typically provide numerous functional capabilities (e.g., data transformation, transaction support, service location, etc.). It will be critical for the implementation team(s) to determine the best blends of these components to satisfy the project and enterprise needs.

The expectation is that moving to a SOA-based environment will enable the Business Relationship Management area to become more proactive in addressing the relationships and services of the many partners and agencies critical to the effective delivery of services. These examples of improved communications and governance will be made available by the evolving technical environment being implemented.

5.2.3 Future Analysis

This section describes the future environment and provides a *conceptual example* of one process use case with a business flow and logical service flow representing the concepts for the desired future environments for Business Relationship Management. The four business processes identified by CMS in the MITA Business Framework for Business Relationship Management are identified in orange in Figure 9. The example described throughout this section is denoted by the yellow arrow.

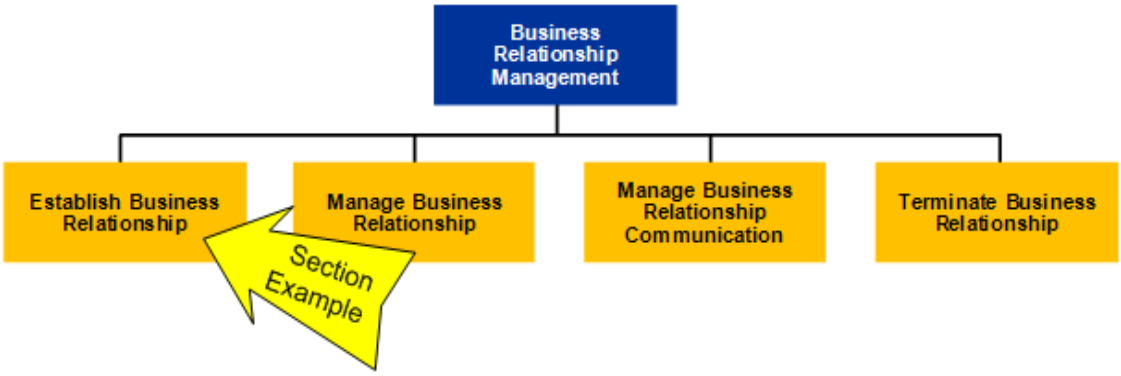


Figure 9: Business Relationship Management Business Framework

These business processes have a common purpose (e.g., establish the interagency service agreement, identify the types of information to be exchanged, identify security and privacy requirements, define communication protocol, and oversee the transfer of information.) For example, the process of developing partner agreements, which outline the data and format necessary for the exchange between entities, are discussed within this MITA business area.

The Business Relationship Management business area was discussed during the final to-be assessment session conducted in 2008. The Agency has determined that this business area is a critical part of the Medicaid enterprise that AHS would like to automate within the next three to five years. To automate this process and achieve a maturity level of three, it will be necessary to implement:

- Standardized, consolidated repository across all departments within AHS that will store all information related to interagency agreements and subcontracts and/or memoranda of understanding between DVHA and AHS, and DVHA and other AHS departments supporting the Medicaid enterprise;
- Automated mechanisms to scan all documents and amendments with linkages of the images accessible from the repository; and
- Standardized automated templates that contain terms and conditions that must be included by regulation yet support variation in scopes of work and performance requirements.

Additional characteristics for Business Relationship Management obtained from the Visioning Sessions, include, but are not limited to:

Business Relationship Management	• Ability to create, collaborate, review, revise and sign MOUs and IGAs online in a single database • Provide a searchable repository of agreements, amendments, addendums, correspondence notes and other associated documents • Ability to link related documents to the agreements; ability to link related agreements. • Provide workflow capability that will automatically route documents to appropriate reviewers for revision, approval and signature • Provide templates for different types of standard agreements • Provide version control on documents and maintain history of agreements • Provide e-signature capability • Provide reporting capability to support management of the inter-department and inter-agency agreements

Table 7: Business Relationship Management – Features

The Establish Business Relationship future business process is provided as a conceptual example for achieving a MITA-aligned environment.

Establish Business Relationship Future Business Environment

The Establish Business Relationship business process involves a combination of business and technical web services to encompass activities undertaken by the Agency to enter into

business partner relationships with other stakeholders for the purpose of exchanging data. These include memoranda of understanding (MOU) and electronic data interchange agreements with providers, managed care organizations, CMS, other federal agencies, Regional Health Information Organizations, and others. A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Establish Business Relationship business process are listed below.

CMS MITA Guidelines: Establish Business Relationship	
Item	**Details**
Result	Agreed upon Business Relationship Established
Shared Data	Provider data store Contractor data store Data from previous agreement for same party Comparable information from other agreements
Constraints	These agreements will be constrained by federal and state policies and regulations
Failures	Parties unable to agree on terms of relationship

Table 8: Business Process for BR Management – Establish Business Relationship

An Establish Business Relationship business process *conceptual* flow diagram is shown below.

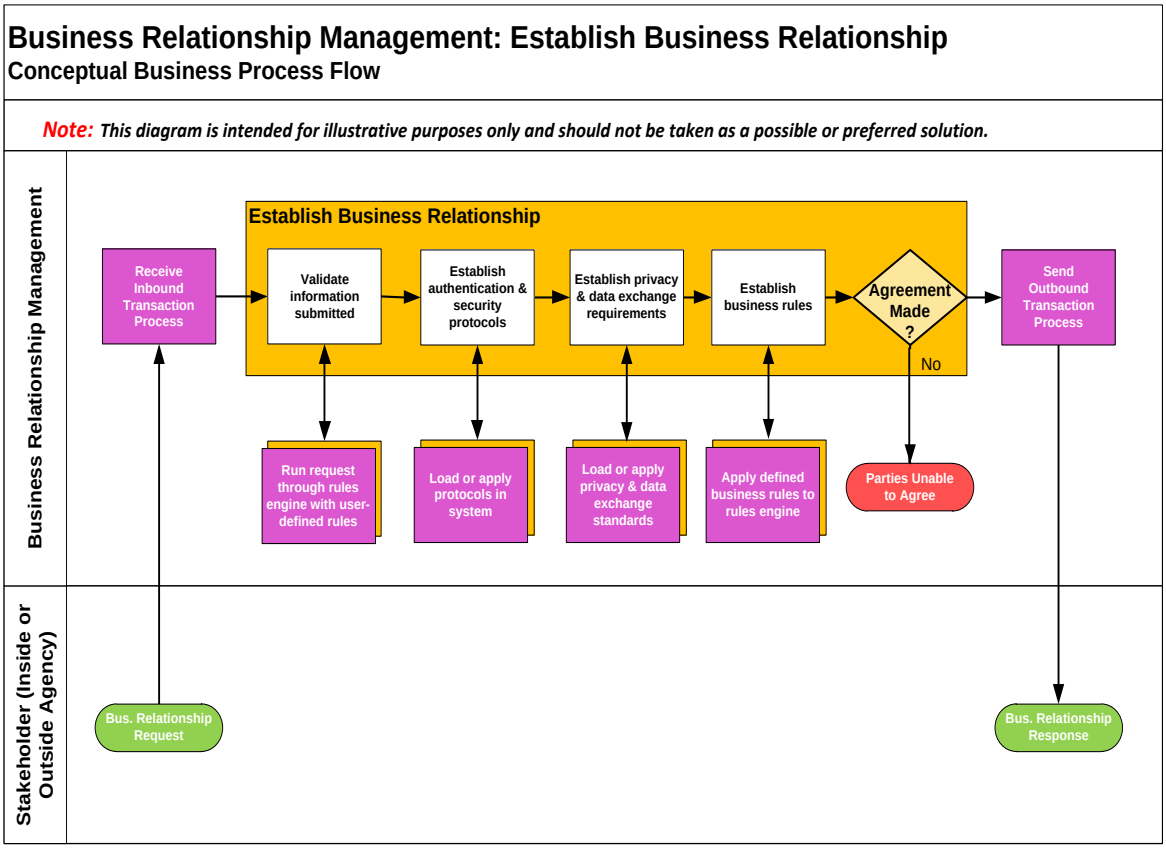


Figure 10: Conceptual Business Process Flow for Establish Business Relationship

Establish Business Relationship Future Information Environment

Information specific to each process and/or service is critical to the successful communication, governance and levels of service expected between partners in the Business Relationship Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Provider data store
- Contractor data store
- Data from previous agreement for same party
- Comparable information from other agreements

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Establish Business Relationship Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Establish Business Relationship service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Portal Access and Presentation for provider service authorization requests and status
- Workflow through business and web services required, with assignment and queue management
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Form/letter generation and other communication-related services for communicating results
- SOA-related web services (such as logging) and other SOA components

The solution set for the Establish Business Relationship service flow would resemble the following graphical representation:

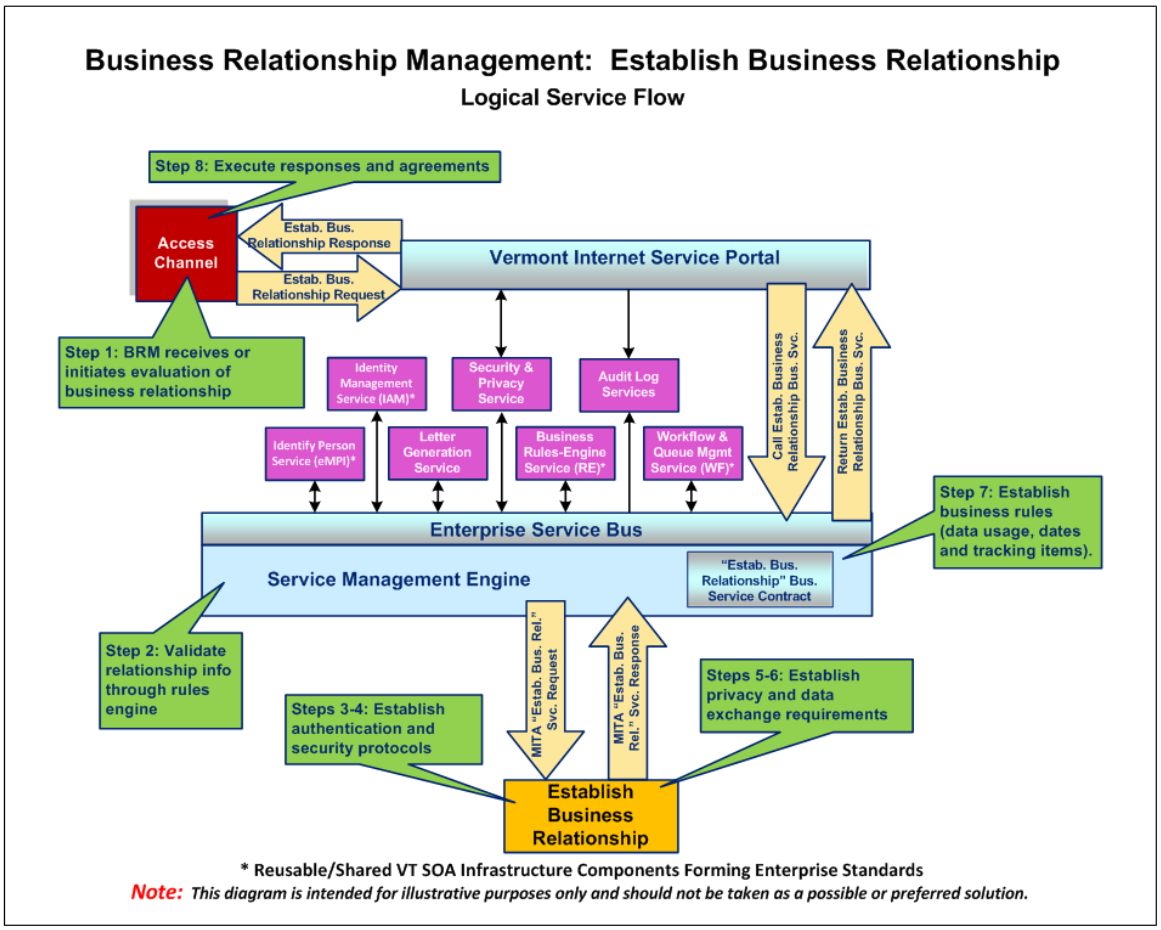


Figure 11: Logical Service Flow for Establish Business Relationship

Figure 11 shows the orchestration of the MITA Establish Business Relationship business service. Orchestration means the diagram represents the coordination and ordering of this business service and the various technical services, along with any human interaction expected, into a process stream to accomplish the objective. This scenario demonstrates a potential communication and establishment of a new business relationship with another entity. The following represents the steps taken:

1. Receive or initiate the content of agreement with other party.
2. Validate information submitted.
3. Establish authentication protocol.
4. Establish security protocol.
5. Establish privacy requirements.
6. Establish data exchange requirements.
7. Establish business rules (includes how data will be used, effective date of the agreement, track frequency, and retention of data).

Details for the other Business Relationship Management business processes are not included in this analysis. These include the following business area/processes:

- Manage Business Relationship
- Manage Business Relationship Communication
- Terminate Business Relationship

5.3 Care Management

The Care Management (CM) business area collects information about the needs of individuals, assesses and develops plans of treatment, targets and measures outcomes, and evaluates individuals' health status. The purpose of the Care Management area is to provide for the health care needs of Vermonters and to manage costs.

APS Healthcare Midwest currently holds a personal services contract with AHS to provide health and disease management services. Under this contract APS collaborates with DHVA to perform assessment administration and intervention services for select members determined to be "at-risk." This contract is due to expire on June 30, 2011 but may be extended for up to three additional years.

5.3.1 As-Is Analysis

CM As-Is Business Environment

For Vermont, promoting the health of their population is a critical part of the Global Commitment to Health waiver. Vermont initiated a Medicaid Chronic Care Management and Care Coordination Program, a Care Coordination Program, and a Buprenorphine Program for the treatment of opioid dependency. Vermont currently contracts with APS for services and use of the CareConnection system. Care management involves both telephonic and in-person services delivered by Care Coordinators who are located regionally and collaborate with emergency rooms and community agencies to manage care. APS also provides analytical services to AHS via reporting. Beneficiaries are selected for the CCMP by using APS' Total Risk Score (TRS) and/or the Johns Hopkins' Adjusted Clinical Groups (ACGs). In addition, Vermont maintains a contract with the University of Massachusetts, Medical School Center for Health and Policy Research for population selection and program monitoring.

Care management activities also occur in other departments within AHS, and involve manual processes and home grown systems. Typical activities currently performed include:

- Population stratification, including collaboration with DHVA for:
- Selection of beneficiaries for the chronic care initiative
- Assignment of beneficiaries for care coordination

- Targeted disease-specific self-management consumer mailings
- Telephonic nurse support from 8:00 a.m. through 6:00 p.m. Monday through Friday, except holidays
- Face-to-face disease management
- Reporting on activities and population health status as requested by the State
- Provide monthly data on beneficiaries in the Buprenorphine Program as needed for evaluation of the Capitated Program for the Treatment of Opiate Dependency (CPTOD)

CM As-Is Information Environment

The data necessary to manage care is currently stored in separate systems (see Figure 12), depending upon an individual's enrollment in a program and the department that manages that specific program (i.e. DAIL's clinical eligibility tools and MH's acute care team that manages hospitals).

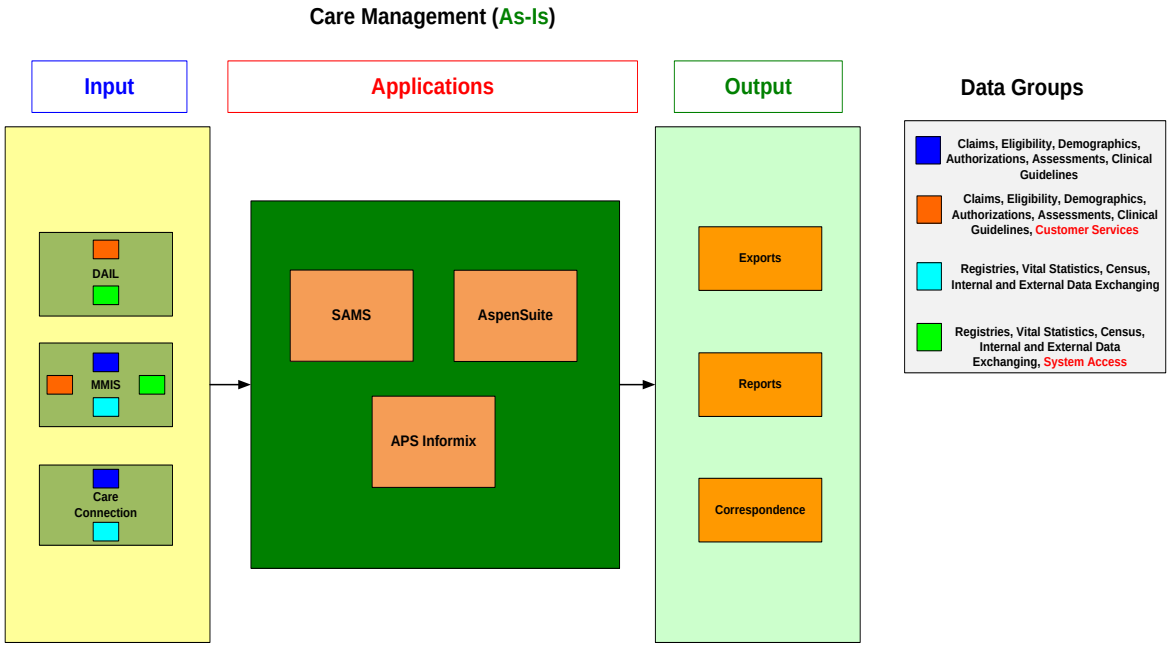


Figure 12: Care Management (As-Is)

CM As-Is Technical Environment

Care Management activities are currently outsourced. APS Healthcare Midwest currently holds a contract with AHS to provide health and disease management services for the DVHA Chronic Care Management Program. Under this contract, APS collaborates with DHVA to perform assessment administration and intervention services for select members determined to be "at-risk".

APS uses its own system, CareConnection, to identify and track cases in the performance

of its contractual duties. Coordination of Care activities in current environment involves management of information in CareConnection, inquiry and other activities using the MMIS and ACCESS eligibility systems.

5.3.2 Evolving Analysis

Because of the imminent replacement of the MMIS system, the Care Management business area is not currently undergoing any major system enhancements or improvements. However, this will change as new technology solutions are implemented to meet the demands of health care reform initiatives.

CM Evolving Business Environment

Methods for achieving improvement in recipient care and care plans are continually examined. As Vermont continues to implement innovative health care reform and begins to realize the benefits of a MITA/SOA aligned environment, major enhancements and opportunities are anticipated.

The table below, which is an extract from the MITA SS-A, documents the maturity levels associated with the current and future vision of the sample business process (Manage Case) for the Vermont Medicaid enterprise. It identifies the departments that perform the business process and provides a gap analysis for the business.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Manage Case			
DCF, DAIL, DMH, VDH	1	3	The process of Managing a Case is manually performed across these departments. Each department manually creates a plan of care then reviews the plans against the actual services a member received. To achieve the desired maturity level, the following needs to be addressed: • Automated development of plan of care services, based upon user-defined criteria. • Development of a centralized Member Registry, which will store all pieces of information about a specific member. Eventually, this registry will include or at least contain linkages to related electronic health records. • Patient management focuses on integrated, self-directed care management, and quality of care.
DVHA	2	3	Although portions of plan care development are manual, certain aspects of the APS CareConnection system utilized by DVHA allow for the automatic review and monitoring of care plans versus the actual services received. To continue the progression and achieve a maturity level of 3, the following

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
			characteristics need adopted: • Development of a centralized Member Registry, which will store all pieces of information about a specific member. Eventually, this registry will include or at least contain linkages to related electronic health records. • Patient management focuses on integrated, self-directed care management, and quality of care.

Table 9: Care Management Gap Analysis

CM Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and extend the information model required to properly address the needs and services of the Medicaid member community, as well as the plans and programs of the Care Management business area.

CM Evolving Technical Environment

The expectation is that moving to a SOA-based environment will enable the Care Management area to become more proactive in properly addressing the assessment, eligibility, plan selection, etc. critical to the effective delivery of services and care to members. These examples of improved communications and governance will be made available by the evolving technical environment being implemented.

5.3.3 Future Analysis

This section will describe the future environment and provide a *conceptual example* of one process use case with a business flow and logical service flow representing the concepts for the desired future environments for Care Management. The four business processes identified by CMS in the MITA Business Framework for Care Management are identified in orange below. The example described throughout this section (Manage Case) is denoted by the yellow arrow in Figure 13.

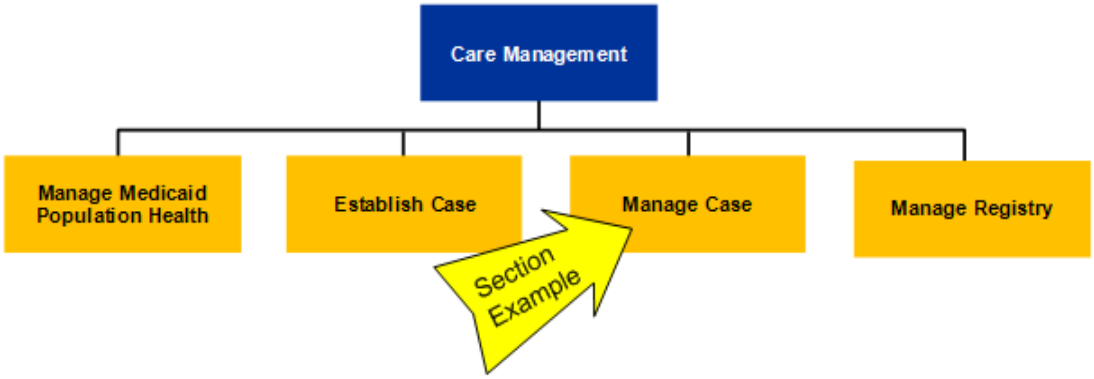


Figure 13: Care Management Business Framework

The Care Management area also contains business processes that have a common purpose (e.g., identify members with special needs, assess needs, develop treatment plans, monitor and manage the plans, and report outcomes). Care Management includes, but is not limited to, the Care Coordination Program, the Chronic Care Management Program, and the Buprenorphine (opiate dependency) Program, as well as programs focused on persons with physical or mental disabilities and children with special health needs. Many of the business processes in this business area are performed manually. The result of the to-be assessment indicates that AHS/DVHA would like to perform these activities in an automated and interoperable manner across the Agency.

To automate this process and achieve a MITA maturity level 3 it will be necessary to implement:

- Automated development of plan of care services, based upon user-defined criteria;
- Development of a centralized Member Registry, which will store all pieces of information about a specific member. Eventually, this registry will include or at least contain linkages to related electronic health records;
- Patient management focuses on integrated, self-directed care management and quality of care. Development of a centralized Member Registry, which will store all pieces of information about a specific member. Eventually, this registry will include or at least contain linkages to related electronic health records; and
- Patient management focuses on integrated, self-directed care management and quality of care.

Additional characteristics for Care Management obtained from the Visioning Sessions, include, but are not limited to the information shown in Table 10.

Care Management	• Clinical guidelines and assessment tools. Ability to select commercial and homegrown clinical protocols to allow for different department usage • Ability to monitor client care (services) against clinical guidelines • Ability to track transitions between levels of care and service providers. Alert case managers when transitions occur • Ability to monitor hospital and nursing home admissions and discharges • Facilitate and document discharge planning activities • Ability to support family-centered care management • Ability to generate educational materials tailored by care and disease focus • Case Management and Case Tracking System • Capture case management activities across the agency • Resource database to identify housing opportunities and transportation providers • Ability to automatically capture registry information, as defined by the Agency • Ability to identify health promotion opportunities through claims data • Decision support and data analytics tools • Ad hoc and standard reporting capability

Table 10: Care Management – Features

The Manage Case future business process is provided as a conceptual example to demonstrate one possibility of a MITA-aligned environment.

Manage Case Future Business Environment

The Manage Case business process uses state-specific criteria and rules to ensure appropriate and cost-effective medical, medically related social and behavioral health services are identified, planned, obtained, and monitored for individuals identified as eligible for care management services under such programs as:

- Medicaid Waiver program case management
- Home and Community-Based Services
- Other agency programs
- Disease management
- Catastrophic cases
- Early Periodic Screening, Diagnosis, and Treatment

These are individuals whose cases and treatment plans have been established in the Establish Case business process. This process also includes activities to confirm delivery of services and compliance with the plan, such as:

- Service planning and coordination
- Brokering of services (finding providers, establishing limits or maximums, etc.)
- Facilitating/advocating for the member
- Monitoring and reassessment of services for need and cost effectiveness

This includes assessing the member's placement and the services being received and taking necessary action to ensure that services and placement are appropriate to meet the member's needs. A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Manage Case business process are shown below.

CMS MITA Guidelines: Manage Case	
Item	**Details**
Result	Case history is updated with revision to the following: Changes to the case history Needs assessment changes Treatment Plan changes Associated Providers List Case file data (e.g., contact dates and times) Content of communications to be sent to providers/members
Shared Data	Member information Provider information Payment history information Benefits/reference

CMS MITA Guidelines: Manage Case	
Item	**Details**
	Case history Assessment protocol Treatment plan protocol Disease data store
Constraints	States and programs within states use different criteria to manage cases. Diseases included in Disease Management differ from state to state. States define and treat catastrophic cases differently. EPSDT case management is not required, but states may choose to have it to strengthen preventive measures.
Failures	Information required to Manage Case is not available, or is inaccurate

Table 11: Business Process for Care Management – Manage Case

A Manage Case business process *conceptual* flow diagram is illustrated below.

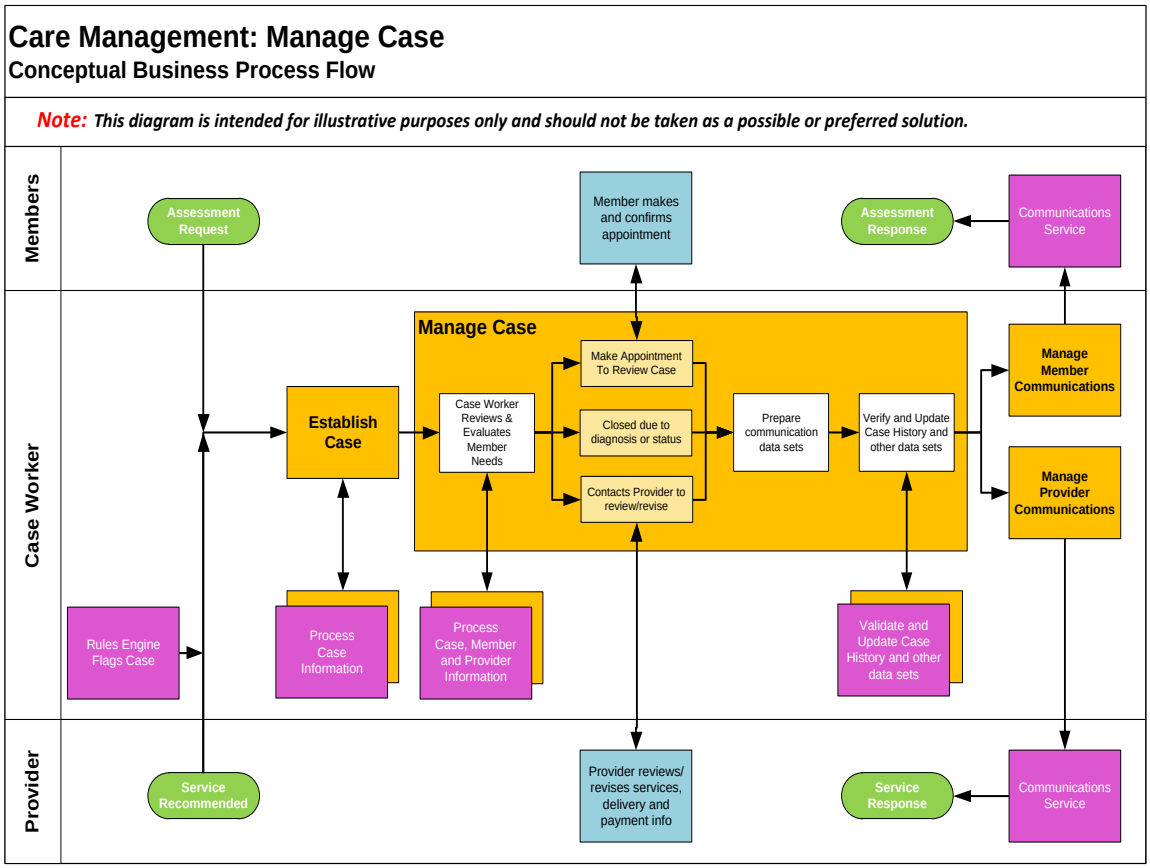


Figure 14: Conceptual Business Process Flow for Manage Case

Manage Case Future Information Environment

Information specific to each process and/or service is critical to the successful care, diagnosis, clinical protocols, training, transitions, discharge plans, etc. of the Care Management business area. This involves databases and documents in various formats used

across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Member information
- Provider information
- Payment history information
- Benefits/reference
- Case history
- Assessment protocol
- Treatment plan protocol
- Disease data store

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Manage Case Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Manage Case service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Portal Access and Presentation for member and provider service payment, eligibility information requests, and status
- Case creation, management and resolution services for requested assistance
- Form/letter generation and other communication-related services for communicating results
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On by state resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

A graphical representation of this solution set for the Manage Case service flow is shown in the following diagram.

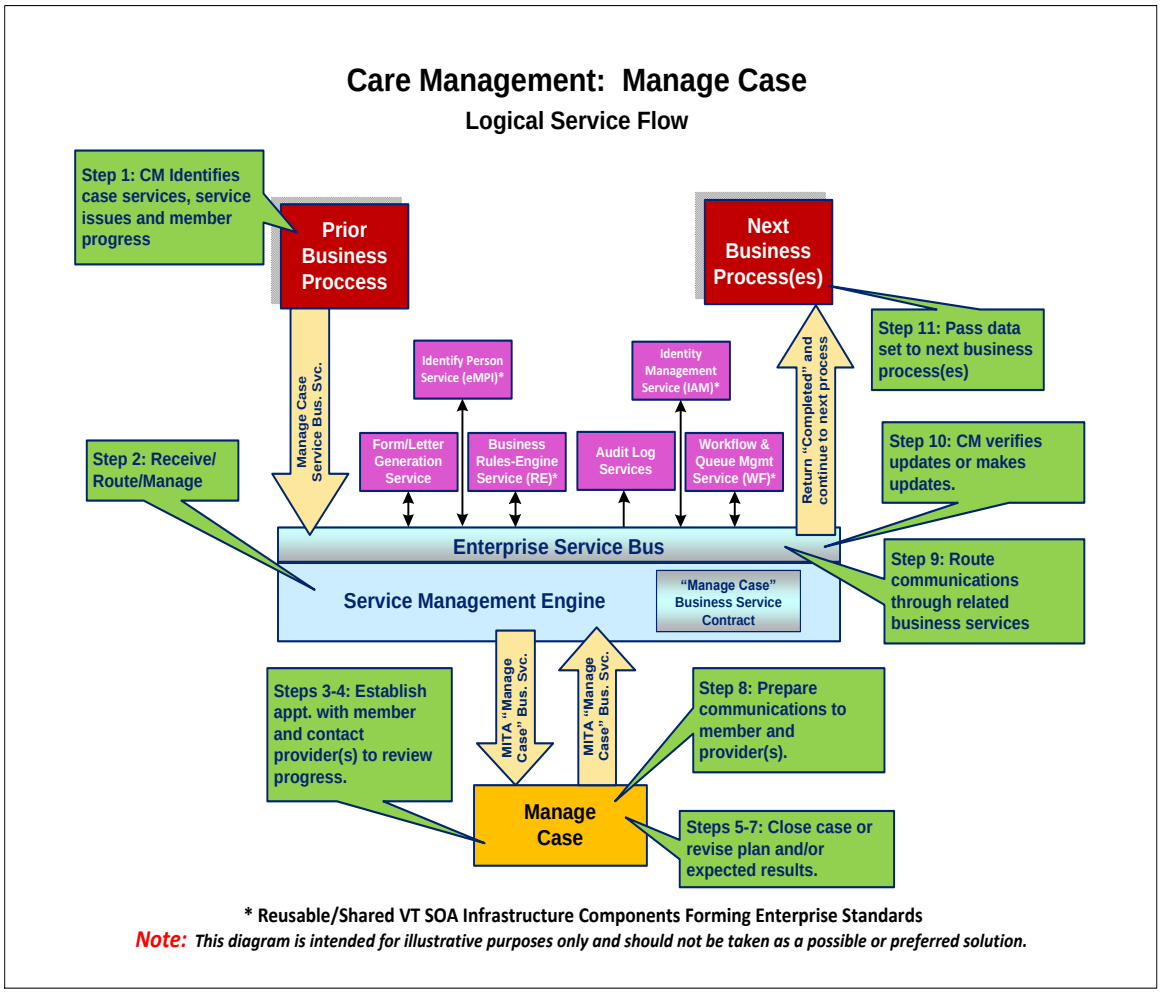


Figure 15: Logical Service Flow for Manage Case

Figure 15 shows the orchestration of the MITA Manage Case business service. This scenario demonstrates a potential case management scenario, where the provider or the member has inquired into payment for a particular service rendered. Managing this case may require some application of business rules as well as human investigation. Upon initiation of case review (review of the member's status and needs), the following steps would be taken for follow-up action, as needed:

1. ID services delivered, issues impeding delivery of service and/or member's progress
2. Establish appointment with member to review case status
3. Contact provider(s) to review member's progress
4. Review services provided (claims payment information)
5. Close case for non-chronic conditions or change in member's status
6. Revise treatment plan to:
    - Add or remove services

- Change nature of plan (e.g. shifting drug regimen, shifting from drug to behavioral)
- Reassess needs

7. Revise expected results
8. Prepare communication data sets for the members and providers
9. Verify that updates to appropriate data store have been made or make updates
10. Send communications data sets to Manage Member and Manage Provider

Details for the other Care Management business processes are not included in this analysis. These include the following business area/processes:

- ❒ Manage Medicaid Population Health
- ❒ Establish Case
- ❒ Manage Registry

5.4 Contractor Management

The Contractor Management (CO) business area is the process by which outsourced contracts are solicited, initiated, monitored, managed, and terminated. Contracts for the Medicaid enterprise may encompass both health services and administrative services.

5.4.1 As-Is Analysis

CO As-Is Business Environment

Currently in Vermont contracting management is performed by each department within AHS and is managed and maintained utilizing MS Office tools. Health and administrative related contracts include such contracts as:

- ❒ APS for Care Management
- ❒ HP for systems and fiscal agent service
- ❒ Health Services Advisory Group (HSAG) as the External Quality Review Organization (EQRO)
- ❒ Ingenix for data services
- ❒ MAXIMUS for member services
- ❒ MedMetrics for pharmacy benefit management

Other contracts exist between departments and the service agencies they employ to perform and manage services, as well as services for technical assistance. A contracting system is currently in use by the Department of Family and Children for limited purposes.

Currently, due to the limited use of a contract system solution, contracts are negotiated, executed and maintained in a more difficult environment than is desirable.

Typically, the current processes for AHS include:

- Identification of the need to execute a contract
- Identification of the parties involved
- Identification of the department, agency, and/or person responsible for drafting the contract
- Preparation of a contract
- Legal review of content
- Execution of signature
- Maintenance of the contract

CO As-Is Information Environment

Currently, the information necessary to manage Contracts is stored in disparate systems (see Figure 16), with no mechanism in place to automatically share or centralize this data.

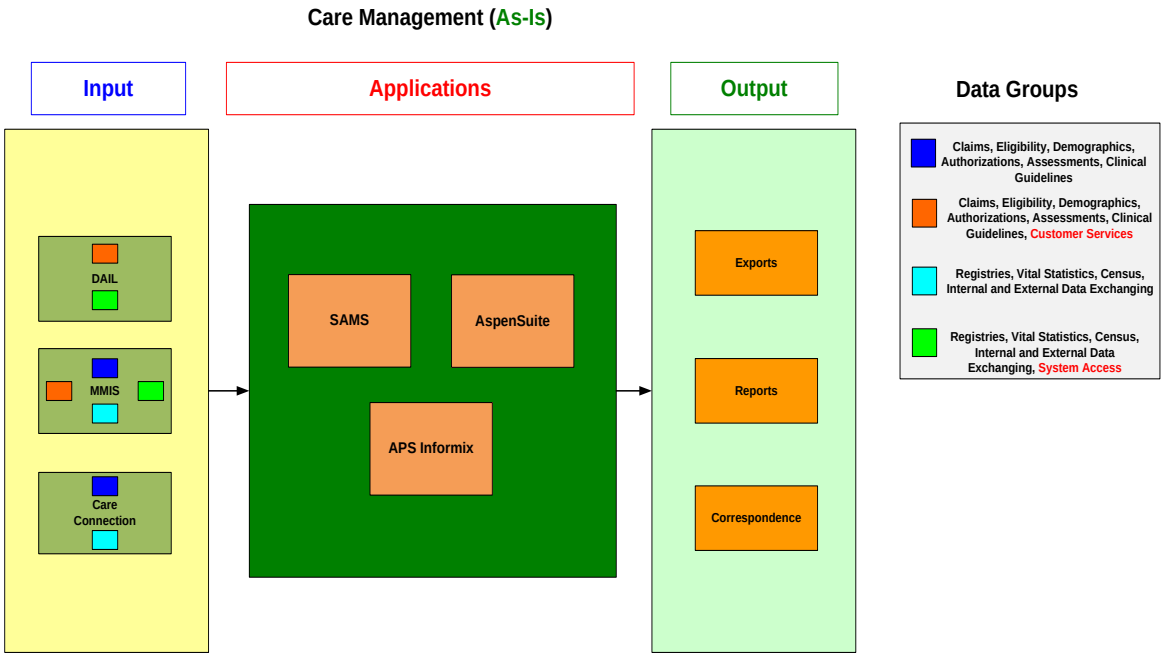


Figure 16: Contractor Management (As-Is)

CO As-Is Technical Environment

Contractor Management activities in the as-is environment are currently characterized as labor intensive, manual processes utilizing MS Office business tools. The capture and

maintenance of documents is a combination of electronic files, paper amendments, attachments and final documents containing original signatures.

5.4.2 Evolving Analysis

The availability of improved processes and data management with the new MMIS will increase productivity and reduce costs. The evolving MMIS system will be built on the principles and products of a SOA with best-of-breed technologies, loosely coupled services, and significant reuse to provide for flexibility and agility in meeting changing business needs.

CO Evolving Business Environment

The Contractor Management business environment is continually examining methods for improvements in contractor relationship management, contractor access (portal), program administration, service processing, etc.

The table below documents the maturity levels associated with the current and future vision of the sample business process (Inquire Contractor Information) for the Vermont Medicaid enterprise. It identifies the departments that perform this process and provides a gap analysis for the business process.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Contractor Information Management – Inquire Contractor Information			
DCF, DAIL, DMH, DVHA, VDH	1	3	The Inquire Contractor Information process is handled manually by each AHS department. To reach a maturity level of 3, the following need to be implemented: • Centralized repository of contractor information accessible to all stakeholders with appropriate levels of security. • Standardized interfaces with any remaining siloed systems. • NPI is the ID of record used in the inquiry of provider information.

Table 12: Contractor Management Gap Analysis

CO Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and extend the information model required to properly address the needs and services of the Medicaid contractor community and the Contractor Management business area. There will be evolving solutions that may be proposed as interim solutions on the roadmap to capability 3 or above. These will be evaluated by the State for consideration and/or

implementation.

CO Evolving Technical Environment

The expectation is that moving to a SOA-based environment will enable the Contractor Management area to become more proactive in properly addressing the relationships and services of the contractors critical to the effective delivery of services. These examples of improved communications and governance will be made available by the evolving technical environment being implemented.

5.4.3 Future Analysis

This section will describe the future environment and provide a *conceptual example* of the Contractor Information Management – Inquire Contractor Information process use case with a business flow and logical service flow representing the concepts for the desired future environments for Contractor Management.

The business sub-process areas identified by CMS in the MITA Business Framework for Contractor Management (Figure 17) are consolidated into four sub-areas (depicted in light blue boxes). The 11 business processes (depicted in orange boxes) are grouped under the MITA-aligned sub-areas that best represent their functions. The section example used throughout this section is denoted by the yellow arrow.

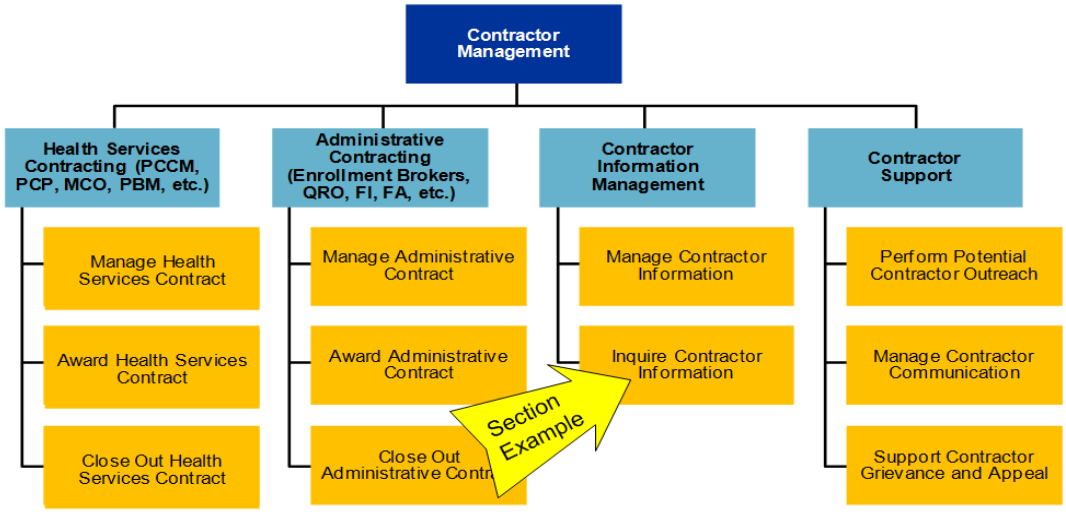


Figure 17: Contractor Management Business Framework

This business area includes two major categories of contracts – health care service delivery contracts (e.g., managed care, at-risk mental health or dental care, primary care physician) and administrative services (e.g., fiscal agent, enrollment broker, Surveillance and Utilization Review [SUR] staff, and third-party recovery). The environment must support the following minimal functionality as defined by the MITA Gap Analysis:

- Centralized repository of contractor information accessible to all stakeholders with appropriate levels of security.
- Standardized interfaces with any remaining siloed systems.
- The National Provider Identifier (NPI) is the ID of record used in the inquiry of provider information.

Additional characteristics for Contractor Management obtained from the Visioning Sessions include, but are not limited to those outlined in Table 13.

Contractor Management	• Ability to create, collaborate, review, revise and sign contracts with external business partners online in a single database • Provide a searchable repository of contracts, amendments, addendums, correspondence notes and other associated documents • Ability to link related documents to the contracts; ability to link related contracts. • Provide workflow capability that will automatically route documents to appropriate reviewers for revision, approval and signature • Provide guidance on how to complete contracts and what parts are required • Provide templates for different types of standard contracts; maintain contact information • Provide version control on documents and maintain history of contracts • Provide e-signature capability • Provide user-defined alerts for dates, such as contract expiration, or events such as contract milestones • Ability to link automatically to the MES for contract rates and terms and financial reporting • Ability to notify contractors and State contractor manager when a contractor is reaching maximums, caps or other limits • Ability to audit contracts • Provide reporting capability to support management of the contracts

Table 13: Contractor Management – Features

Within the MITA Framework Contractor Information Management is defined as a group consisting of the following processes:

- Manage Contractor Information Management
- Inquire Contractor Information

The Inquire Contractor Information future business process is provided as a conceptual example for achieving a MITA-aligned environment.

Contractor Information Management – Inquire Contractor Information Future Business Environment

The Inquire Contractor Information business process involves a combination of business and technical web services. It receives:

- Requests for contract verification from authorized providers, programs or business associates
- Performs the inquiry
- Prepares the response data set for the send outbound transaction process

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Inquire Contractor Information business process (Table 14) are shown below.

CMS MITA Guidelines: Inquire Contractor Information	
Item	**Details**
Result	Contract verification response data set routed to send outbound transaction process. Data set may include information such as contract start/end dates, Contractor type and specific specialties. Tracking information regarding the interchange as needed for the Inquire Contractor Information process for measuring performance and business activity monitoring.
Shared Data	Contractor data store
Constraints	States determine what information can be shared.
Failures	Process unable to process the contractor information verification request.

Table 14: Business Process for Contractor Management–Inquire Contractor Information

The Inquire Contractor Information business process *conceptual* flow diagram (Figure: 18) can be illustrated in the following manner.

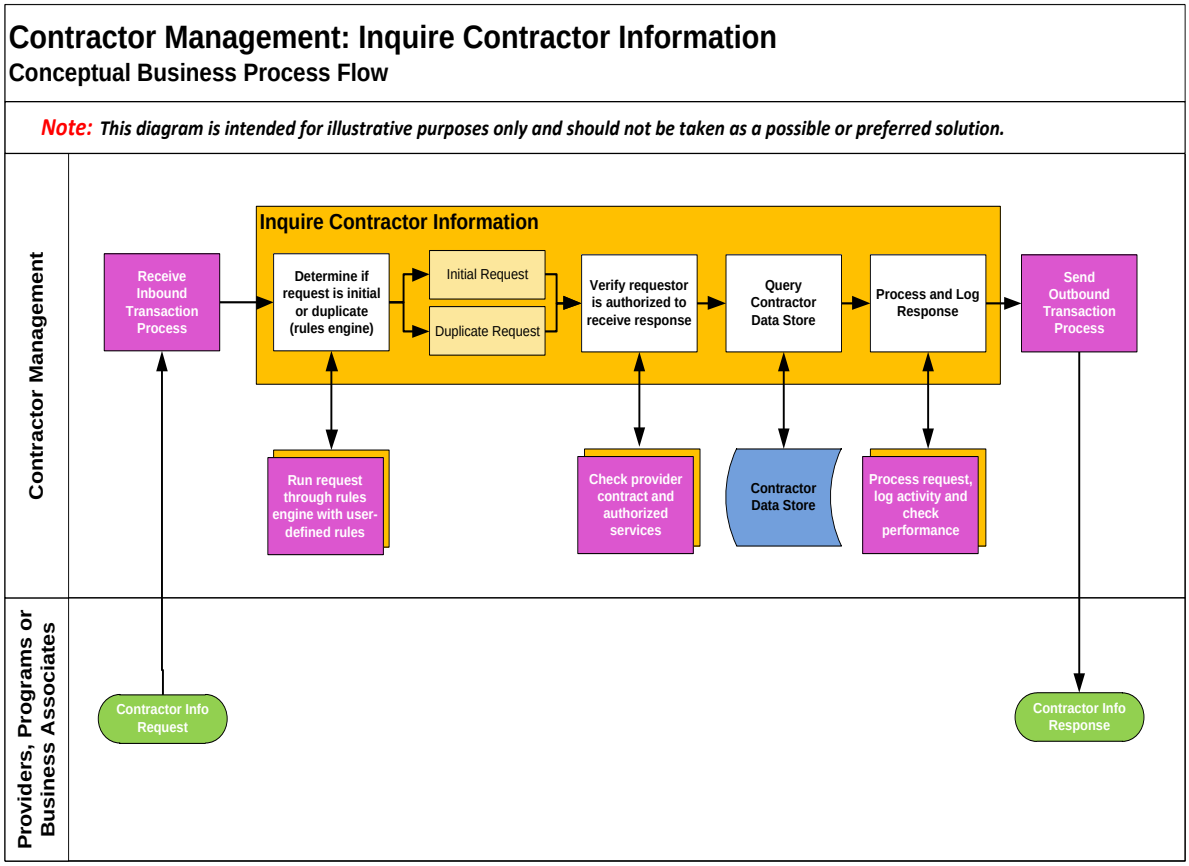


Figure 18: Conceptual Business Process Flow for Inquire Contractor Information

Contractor Information Management – Inquire Contractor Information Future Information Environment

Information specific to each process and/or service is critical to the successful relationship, service processing, payment, service, and payment histories, etc. of the Contractor Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Contractor demographics
- Contractor services
- Contractor financial information
- Contractor history

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Contractor Information Management – Inquire Contractor Information Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Inquire Contractor Information service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Portal Access and Presentation for stakeholder contractor information requests and status
- Form/letter generation and other communication-related services for communicating results Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On (SSO) by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

The following is a graphical representation of this solution set for the Inquire Contractor Information service flow.

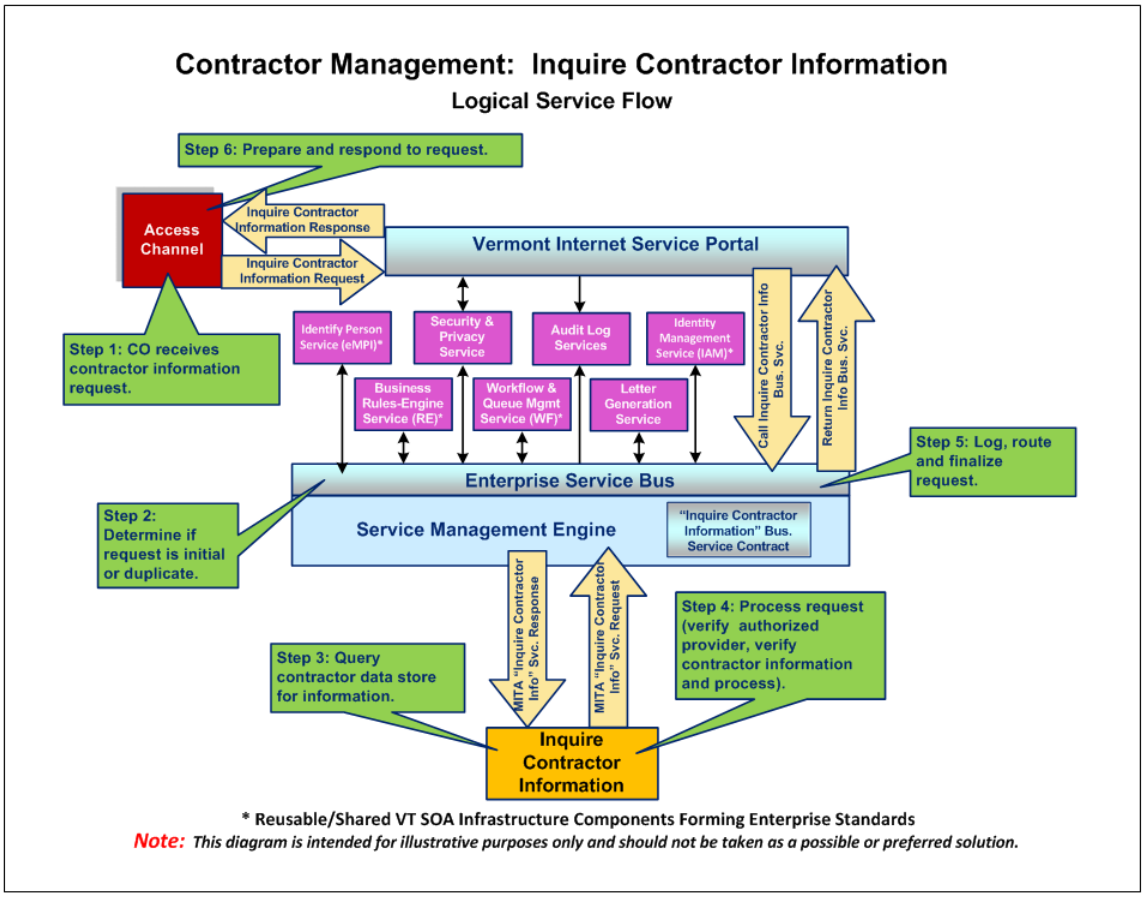


Figure 19: Logical Service Flow for Inquire Contractor Information

Figure 19 shows the orchestration of the MITA Inquire Contractor Information business service. This scenario demonstrates a potential communication and inquiry from a stakeholder about an established State contractor. The following describes the steps taken:

1. Receive contract verification information data set from inbound transaction process.
2. Situational: Determine request status as initial or duplicate.
3. Query contractor data store for requested information.
4. Process response.
5. Situational: Log response.
6. Prepare response data set for the send outbound transaction process.

Details for the other Contractor Management business processes are not included in this analysis. These include the following business area/processes:

- Health Services Contracting
  - Manage Health Services Contract
  - Award Health Services Contract
  - Close Out Health Services Contract

- Administrative Contracting
  - Manage Administrative Contract
  - Award Administrative Contract
  - Close Out Administrative Contract
- Contractor Information Management
  - Manage Contractor Information
- Contractor Support
  - Perform Potential Contractor Outreach
  - Manage Contractor Communication
  - Support Contractor Grievance and Appeal

5.5 Member Management

The Member Management (MM) business area focuses on those activities related to all members and potential members (applicants), including outreach and communication, eligibility decisions and managing member information.

5.5.1 As-Is Analysis

MM As-Is Business Environment

The Member Management business area is a cross department, AHS administered set of activities. The financial eligibility is managed by Department for Children and Families and passed to DVHA and other outsourced entities, such as, the PBM, MAXIMUS, and APS. Clinical eligibility is managed by three departments – Vermont Department of Health, DAIL, and DMH for their program areas. Member Services functions are outsourced and performed by MAXIMUS, Inc., under the direction of DVHA. Typical activities for the Member Management business area currently include:

- Ensuring the processing and reconciliation of electronic eligibility records from DCF,
- Ensuring that a timely, accurate, automated, and date sensitive data repository of eligible beneficiaries is maintained,
- Ensuring maintenance of benefits plans, categories of service, program eligibility information for the Medicare program, Medicare, Third Party Liability, Buy-in, LTC, Patient Share of Cost, hospice, member lock- in, and other information needed to accurately process claims and manage the membership.
- Ensuring production of identification cards for beneficiaries.
- Supporting inquiries on eligibility.
- Interfacing with other systems, departments, and providers.
- Generating of standard and ah-hoc reports on enrollment, disenrollments, etc.

Member Services functions are performed by MAXIMUS, Inc., which is responsible for informing the eligible population and other interested individuals about state health care

programs, policies, and benefits. MAXIMUS acts as DVHA's agent, responding to member questions and application requests, and referring cases to the appropriate programs.

The Member Services contractor performs ongoing enrollment and education activities, project coordination, technical analysis, data collection quality assurance, and reporting tasks, which include:

- Telephone access for members and other interested parties;
- Outreach activities to provide information to members, providers, and other interested parties regarding the State's health care programs;
- Education activities to provide information about program policies and benefits to individuals, enrollees, and benefits counselors;
- Enrollment Activities to assist members with health plan enrollment;
- Processing Fair Hearing requests and
- Reporting and tracking calls, complaints, grievances, and appeals.

MM As-Is Information Environment

A number of systems across the Agency are currently utilized to capture and perform functions (Figure 20) based upon the Member Management groups of data. For example, ACCESS collects the demographics and other information necessary to determine an individual's financial eligibility. Likewise, Social Assistance Management System is used to collect information and record the results of a clinical determination. This information is then shared with the supporting systems (i.e. the MMIS, RxClaims and MaxStar) as necessary.

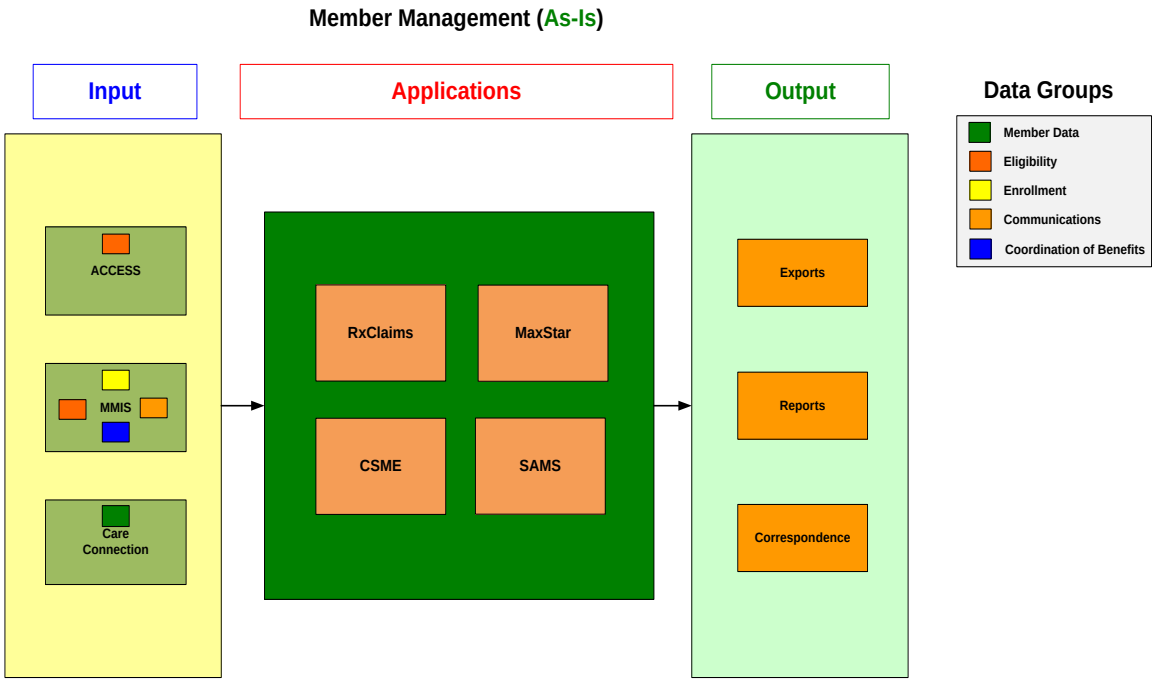


Figure 20: Member Management (As-Is)

Member Management As-Is Technical Environment

Member Management activities are supported by the MMIS capture of electronic files from ACCESS, and services provided by MAXIMUS using MaxStar. In the current environment, member information can also be obtained using automated voice response system (AVRS) and web sites. Electronic files are exchanged in HIPAA 270/271 transactions and POS devices.

5.5.2 Evolving Analysis

Member Management will transition from the current process capability levels (including some manual processes) to the MITA level 3 capabilities outlined below.

MM Evolving Business Environment

AHS has been in the process of making changes to improve services and has procured and installed two major components of its future Enterprise. The Department for Children and Families, is responsible for processing Medicaid eligibility determination, and is involved in two projects: the Economic Services Division Modernization, which will reinvent many of its business processes, and Strategic Transformation of Enterprise for Effective Realignment (STEER), and has implemented technology improvements, such as imaging and call center support.

Table 15 documents the maturity levels associated with the current and future vision of the sample business process (Inquire Member Eligibility) for the Vermont Medicaid enterprise. It identifies the departments that perform the business process and provides a gap analysis for the business.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Member Information Management - Inquire Member Eligibility			
DCF, DAIL, DMH, VDH	1	3	To achieve a maturity level of 2, the following components need to be implemented: • Development of a centralized Member Registry, which will store all pieces of information about a specific member. Eventually, this registry will include or at least contain linkages to related electronic health records. To progress from a maturity level 2 to a maturity level 3, these components need to be addressed: • All information within the Member Registry will be recognized by a unique identifier. This standardization allows for easier communication and data sharing among state agencies. • Standardized responses contain both program and

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
			benefit information, as well as primary care physician or managed care affiliation. • Information is available through a number of mechanisms (i.e. electronically via the web, HIPAA 270/271 transactions, point of sale devices and via the telephone by the automated voice response (AVR) system.
DVHA	2	3	By supplementing the existing access methods (web portal, electronic data interchange, AVR, and point of service) with the following items, maturity level 3 will be achieved: • All information within the Member Registry will be recognized by a unique identifier. This standardization allows for easier communication and data sharing among state agencies. • Standardized responses contain both program and benefit information, as well as primary care physician or managed care affiliation. • Information is available through a number of mechanisms (i.e. electronically via the web, HIPAA 270/271 transactions, point of sale devices and via the telephone by the automated voice response (AVR) system.

Table 15: Member Management Gap Analysis

MM Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and extend the information model required to properly address the needs and services of the Medicaid member community and the Member Management business area.

MM Evolving Technical Environment

The transition to a SOA-based environment will enable the Member Management area to become more proactive in properly addressing member tracking, eligibility, level of care, service delivery, etc. These examples of improved communications and governance will be made available by the evolving technical environment being implemented.

5.5.3 Future Analysis

This section will describe the future environment and provide a *conceptual example* of the Member Information Management - Inquire Member business process. The business sub-areas identified by CMS in the MITA Business Framework for Member Management (Figure 21) are consolidated into four sub-areas (depicted in light blue boxes).

The eight business processes (depicted in orange boxes) are grouped below under the MITA-aligned sub-areas that best represent their functions. The example provided throughout this section is denoted by the yellow arrow.

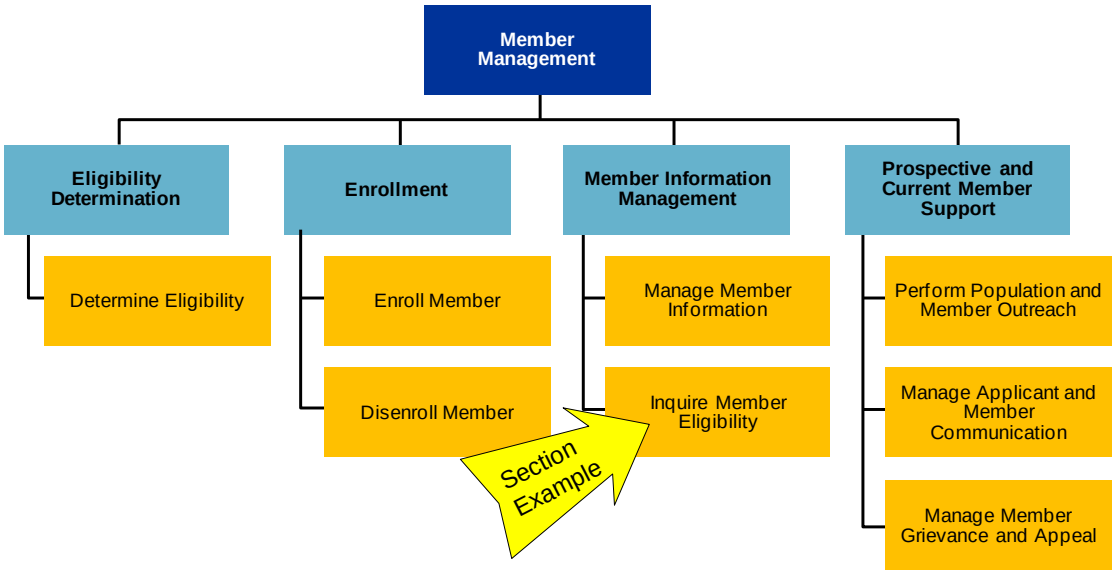


Figure 21: Member Management Business Framework

To achieve MITA-aligned business processes with a MITA maturity level of 3 or higher is the environment must support the following minimal functionality as defined by the MITA Gap Analysis:

- All information within the Member Registry will be recognized by a unique identifier. This standardization allows for easier communication and data sharing among state agencies.
- Standardized responses contain both program and benefit information, as well as primary care physician or managed care affiliation.
- Information is available through a number of mechanisms (i.e. electronically via the web, HIPAA 270/271 transactions, point of sale devices, and via the telephone by the automated voice response (AVR) system). Standardized and centralized data (i.e. service and claims information) across departments enables the tracking of utilization patterns and the subsequent collection of case data.

Additional characteristics for Member Management obtained from the Visioning Sessions include, but are not limited to, those in Table 16:

Member Management	• Single application for all services available online as well as traditional hard copy • Online application guides the applicant through the appropriate questions based on responses received on earlier responses • Provide member portal and/or kiosk support for single application process • Route member applications to the appropriate department / staff for consideration • Real-time exchange of data for eligibles regarding their status and aid categories • Ability to merge and unmerge member records • Logic to prevent entry of duplicate member records • Automatically generate notices to applicants using standard user-defined templates • Links to e-MPI to identify beneficiaries active with other programs and identify services • Identify retroactive eligibility and apply it appropriately to existing claims and service history • Ability to generate member communications in multiple languages • Support for improved consolidated call center than can route callers to the right place for inquiry responses • Integrated Grievance and Appeals dataase with workflow and tracking capability • Automatically generate Grievance and Appeals related correspondence • Ability to attach supporting documentation to case record • Automatically generate notices to other departments and members regarding other program eligibility • Ability to view all program eligibility for an individual • Improved handling of patient share of cost • Ability to capture marital status of all beneficiaries

Table 16: Member Management – Features

The Member Information Management - Inquire Member future business process is provided as a conceptual example for achieving a MITA-aligned environment.

Member Information Management – Inquire Member Eligibility Future Business Environment

The Inquire Member Eligibility business process involves a combination of business and technical web services to retrieve determine a member's eligibility (e.g., member demographics, eligibility spans, qualified plans, etc.) for health-related services. It also performs the inquiry and prepares the response data set to be passed to the "Send Outbound Transaction" process, which generates the outbound Eligibility Verification Response Transaction. This transaction will, at minimum, indicate whether the member is eligible for some health benefit plan coverage under Medicaid, in accordance with HIPAA. This transaction may include more detailed information about the Medicaid programs, specific benefits and services, and the provider(s) from which the member may receive covered services. A few key general guidelines (results, shared data, constraints, failures) identified by CMS MITA for the Inquire Member Eligibility business process are shown in Table 17.

CMS MITA Guidelines: Inquire Member Eligibility (IME)	
Item	**Details**
Result	Eligibility Verification Response data set routed to Send Outbound Transaction process. Data set may include information such as eligibility start/end dates, programs the member is enrolled in, the providers that may render services, and covered benefits and services. Tracking information regarding the interchange for the Inquire Member Eligibility process, measuring performance, and business activity monitoring.
Shared Data	Member data store: Member demographics, benefit package, enrollment data;

CMS MITA Guidelines: Inquire Member Eligibility (IME)	
Item	**Details**
	applicant/member financial, social, functional, and clinical data. Data sets received and sent based on the HIPAA X12 270/271, NCPDP Telecommunications Guide (current version), and Batch Guide (current version).
Constraints	Eligibility verification request can ask for verification at the categorical, program, provider, or benefit level per X12 270 depending on trading partner agreements. For example, some trading partner agreements may support only a minimal response concerning eligibility status for general health benefit plan coverage (categorical level) as required by HIPAA.
Failures	Process unable to process Eligibility Inquiry Request Requester not authorized to receive requested information at the level asked, e.g., eligibility for mental health program, however requester may receive more general information such as verification of eligibility for health benefit plan coverage. **Note:** Responses that a member is not eligible or is not active are not failures to process the request.

Table 17: Business Process for Member Management – Inquire Member Eligibility

The MITA business services help to ensure that implementations are interoperable and plug-and-play capable. The Inquire Member Eligibility business process *conceptual* flow diagram is illustrated below (Figure 22).

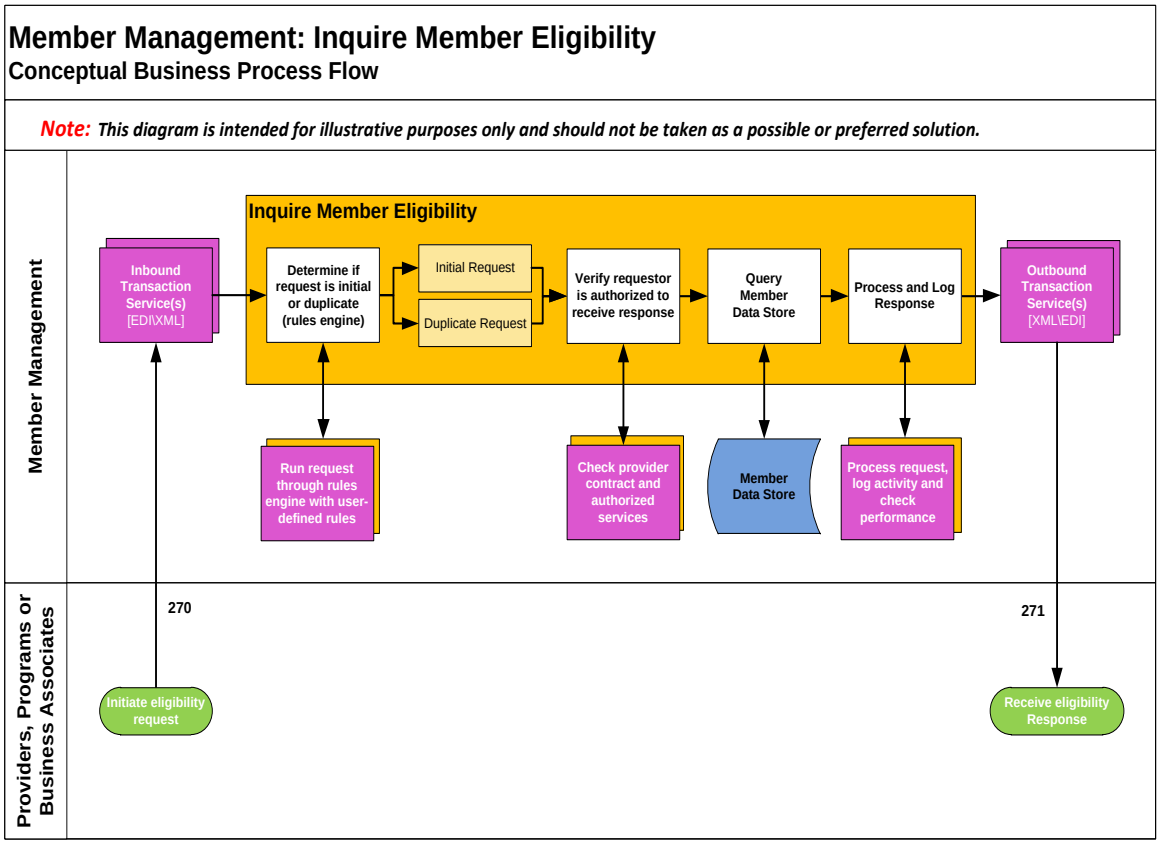


Figure 22: Conceptual Business Process Flow for Inquire Member Eligibility

Member Information Management – Inquire Member Eligibility Future Information Environment

Information specific to each process and/or service is critical to the successful member access (portal), application routing, status inquiry, duplicate and merge management, beneficiaries, eligibility, retroactivity, grievance, member cost sharing, etc. of the Member Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Member data store: member demographics, benefit package, enrollment data; applicant/member financial, social, functional, and clinical data.
- Data sets received and sent based on the HIPAA X12 270/271 and NCPDP Telecommunications Guide (current version) and Batch Guide (current version).
- This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Member Information Management – Inquire Member Eligibility Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Inquire Member Eligibility service to meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Portal Access and Presentation by stakeholders for member eligibility requests and status
- Form/letter generation and other communication-related services for communicating results.
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Inquire Member Eligibility service flow is shown in the following diagram.

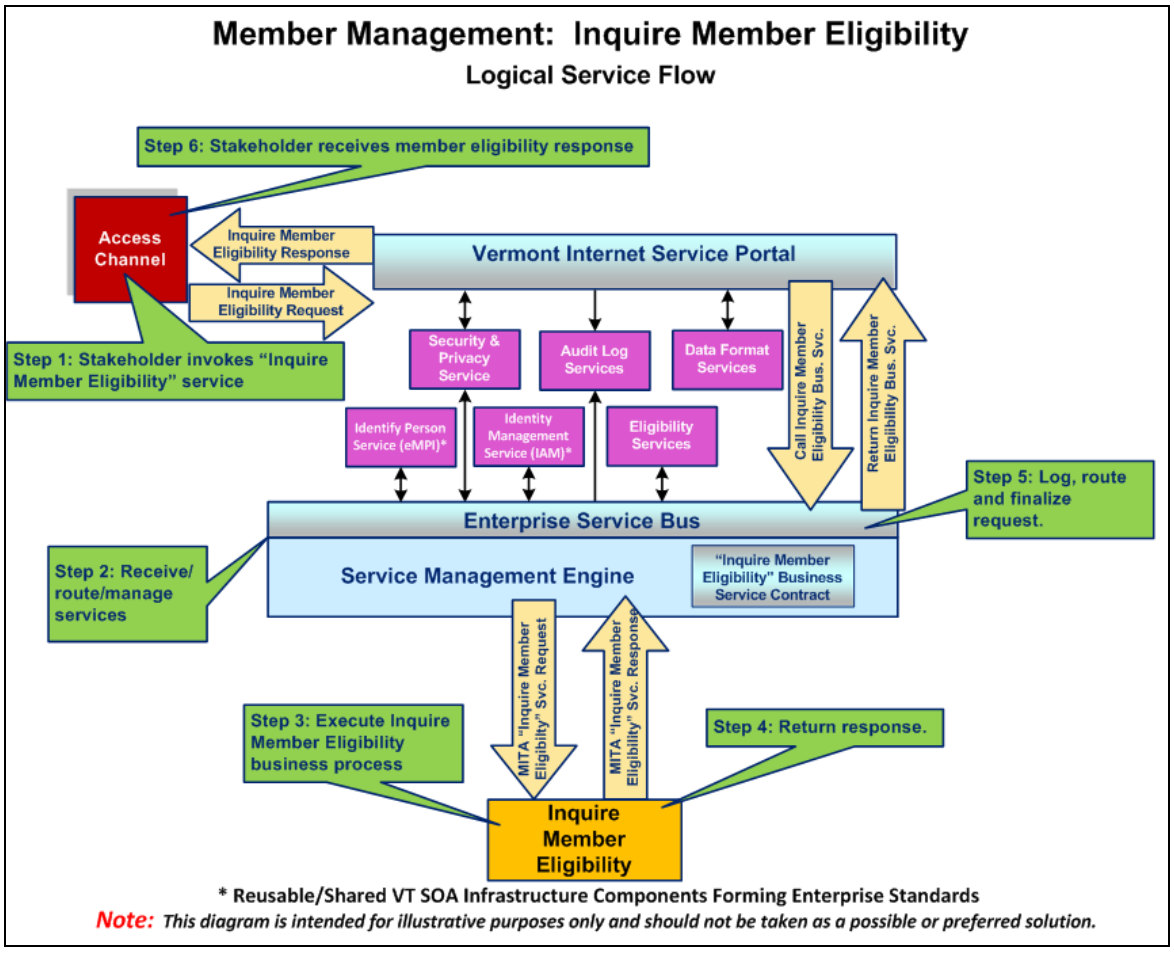


Figure 23: Case # 1 - Logical Service Flow for Inquire Member Eligibility

Figure 23 shows the orchestration of the MITA Inquire Member Eligibility business service. This scenario demonstrates a potential member or stakeholder checking on a member's eligibility for Medicaid-paid services and specific eligibility characteristics/values. Although this scenario shows a potential member initiating the process, it could also be initiated by a State of Vermont Medicaid staff member. The following represent the steps taken:

1. A potential member makes a request via the MITA access channel. This request could be done using a web client, PDA or kiosk (to cite a few possible technical solutions). The Access Channel and Member Service Portal will call MITA technical services (shown in purple boxes) to perform the following activities (details on MITA technical services can be found in Section 7 – Technical Architecture Analysis):
    - Data Format Services – support device specific protocols, wrap payload data with MITA envelope, and perform high level data validation.

- Security & Privacy Services – authenticate user, single logon/sign-on, validate user is authorized to perform this function, and use of data (privacy).
- Logging Services – captures all input/output data to a log.

Note: Some of the services may be invoked from the Enterprise Service Bus and not the service portal, hence the arrow from the ESB to the Logging Service.

2. The ESB and Service Management Engine (SME) route the MITA message to the appropriate MITA business service. The service contract is used to determine how this service is invoked. In this case the ESB/SME will determine where the service is located and routing the message to the appropriate ESB.
3. The Inquire Eligibility Service (shown in orange box) receives the MITA inquire eligibility request and executes the business logic associated with the request. This business logic abides by the general guidelines listed above in the CMS MITA guidelines chart.
4. This scenario depicts a successful execution of the business logic resulting in a reply message indicating potential beneficiary's eligibility. The message generated is a MITA-formatted message (i.e. MITA envelope and payload).
5. ESB/SME determines what to do after receiving response message (was message expected, who should receive the message, should other business services be invoked). In this example the Inquire Eligibility Response message is routed to the Member Service portal.
6. The service portal/access channel log the response, validate security and privacy rules, and translate the data into the specific format required by the initiating request used by the requestor. The potential member then receives the response that they are eligible and for what services and levels (i.e., funding amount) they are allotted.

Details for the other Member Management business processes are not included in this analysis. These include the following business area/processes:

- ❒ Eligibility Determination
  - Determine Eligibility
- ❒ Enrollment
  - Enroll Member
  - Disenroll Member
- ❒ Member Information Management
  - Manage Member Information
- ❒ Prospective and Current Member Support
  - Perform Population and Member Outreach
  - Manage Applicant and Member Communication
  - Manage Member Grievance and Appeal

5.6 Operations Management

Operations Management (OM) business activities involve management of the claims control and processing, cost recoveries and avoidance, service authorizations, claims payments and receivables, and management of financial information.

5.6.1 As-Is Analysis

OM As-Is Business Environment

The Operations Management business area is driven by the Vermont Global Commitment to Health Waiver and is overseen by AHS and administered by DVHA acting as the statewide Public Managed Care Organization. DVHA contracts for services delivered by other AHS departments. The Department of Education, not part of AHS, also provides services and submits claims to DVHA for Medicaid covered benefits for students. DVHA manages operations that support the payment of providers for Home and Community Based organizations managed by DAIL, DCF children and family service programs, VDH health services, and mental health services for DMH. In addition, DVHA is responsible for processing Medicare cross-over claims, TPL, coordination of benefits, and CHIP programs. DVHA manages and determines the cost effectiveness and cost avoidance opportunities for the Employee Sponsored Insurance premiums payment and Health Insurance Premium Payment (HIPP).

Because of the expansion of services under the Global Commitment Waiver, DVHA also processes claims for the offerings available to those eligible under the waiver. They currently include the Vermont Health Access Plan (VHAP) and Prescription Drug Assistance (PDA) programs.

Typical Operations Management activities include:

- Ensuring claims and related supporting documentation is accurately captured via HIPAA compliant electronic data interfaces (EDI), and paper
- Management, control, and tracking of the movement of claims through the systems
- Edit/audit, adjudication and pricing of claims according to eligibility of beneficiaries and providers, benefit package, and payment rules, as defined by state and federal requirements
- Automatic adjudication of claims, as appropriate
- Management of service authorizations to verify the medical necessity of services prior to provision of the services
- Management of service authorizations to ensure correct application of authorizations to claims processing and payments
- Management of claims for Third Party Liability (TPL), coordination of benefits to ensure active recovery and cost avoidance

- Payment processing for adjudicated pharmacy claims received from their Pharmacy Benefit Manager, and adjudication of pharmacy claims processed from providers for medical benefit services
- Price and value encounters
- Processing of payments for eligible beneficiaries in the Employee Sponsored Insurance program
- Management of HIPP processing
- Management of estate, hospice, trust and, annuity settlements
- Management of Patient Share of Cost claims.
- Management and follow-up on recoveries when a refund or payment adjustments are required from providers or beneficiaries
- Support of the Pharmacy Drug Program (PDP)
- Management of supplemental and state drug rebate programs
- Management of voids and adjustments, including mass adjustment
- Accurate update of code sets, benefit plans, pricing, and other information needed to process claims
- Management of accurate financials and ensuring that EFT transaction and hardcopy checks are issued in accordance with state and federal policy
- Management of expenditures
- Interfacing with other systems to obtain accurate and timely eligibility, provider, pharmacy, case management and, customer service information
- Interfacing with other systems to manage claim payment information
- Generation of appropriate Remittance Advices (RA), Explanation of Benefit (EOBs), correspondence, and documentation
- Extensive report generation

OM As-Is Information Environment

The data necessary to support the functions contained within Operations Management is stored within a number of systems across the Agency (Figure 24). The main components currently being performed are the sharing and syncing of this information between ACCESS, the MMIS, and SAMS.

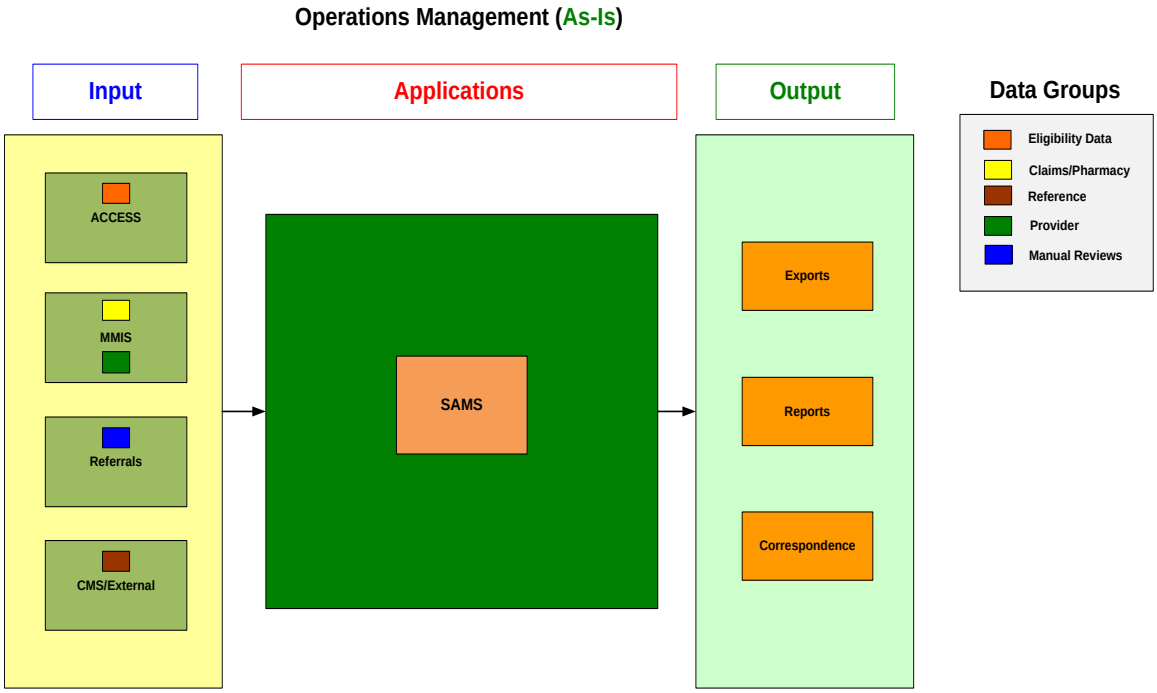


Figure 24: Operations Management (As-Is)

OM As-Is Technical Environment

Operations Management activities in the as-in environment are currently managed via the MMIS system and the point-of-service (POS) interface, which is done by MedMetrics using the SXC pharmacy platform. Processing and paying claims submitted by providers and other departments on behalf of their providers are major activities. Other typical activities include:

- Both electronic and paper claims
- Receipt of electronic claims from MedMetrics for payment per pricing identified by MedMetrics
- Edit/audit price claims based on benefit rules
- Imaging of supporting documents;
- Manually loading reference files
- A high percentage of auto adjudication of claims
- Generation of financial information
- Generation of Remittance Advices
- Generation of standard and ad-hoc reports
- Data warehouse for provider proofing and other reporting

Included in claims processing is the Authorize Service process that is currently characterized by a largely manual set of activities. Service authorization requests are

received on paper, data entered into the MMIS, evaluated for eligibility of the beneficiary and provider through manual look-up, and verified for medical necessity based on manual determinations. Documentation of decisions and the recording of supporting documents is a manual process. The processing of claims against approved authorizations is performed automatically in the MMIS.

The prepare EOB is an automated process generated from the MMIS. EOBs are not generated for each payment cycle, but are generated quarterly as part of a random EOB selection process to support the Program Integrity business functions.

5.6.2 Evolving Analysis

The Operations Management business area will transition from the current process capability levels (including some manual processes) to the MITA level 3 capabilities outlined below.

OM Evolving Business Environment

Because of the imminent replacement of the MMIS system, the business area is not currently undergoing any major system enhancements or improvements.

Table 18 is an extract from the MITA SS-A. It documents the maturity levels associated with the current and future vision of the sample business processes (Audit Claim/Encounters, Authorize Services, Manage Drug Rebate, Manage TPL Recovery and Prepare EOB) for the Vermont Medicaid enterprise. It identifies the departments that perform these business processes and provides the associated gap analysis.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Claims/Encounter Adjudication – Audit Claim Encounter			
DVHA	2	3	The process of Auditing Claims/Encounters is also supported by the MMIS. The automation necessary to achieve a maturity level 3 is described by the following items: • Increased utilization of electronic data interchange for claims submission. • Creation and Maintenance of audits is driven by the rules-engine, allowing for much simpler modification.
Service Authorization – Authorize Service			
DCF, DAIL, DMH, DVHA, VDH	1	3	Currently, the Authorize Service process is performed manually. Each department authorizes the services related to their programs and sends the information for entry into the MMIS. The automated functionality necessary to achieve a maturity level 3 is described below. • Web functionality to allow providers to request

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
			and review status of Prior Authorizations. • Flexibility to quickly adjust business rules associated with requiring service authorizations.
Cost Recoveries – Manage Drug Rebate			
DVHA	1	3	The Manage Drug Rebate process is currently performed manually. To achieve a maturity level 3, the following components need to be addressed: • Standardized, consolidated repository of information across all departments within AHS. • Automated electronic interchanges (interfaces) between agencies and drug manufacturers.
Cost Recoveries – Manage TPL Recovery			
DVHA	1	3	The Manage TPL Recovery process is manually performed. The functionality required to achieve a maturity level 3 consists of the following: • Standardized, consolidated repository of information across all departments within AHS/DVHA. • Automated electronic data interchange between AHS/DVHA and other payers.
Payment and Reporting – Prepare EOB			
DVHA	1	3	DVHA manually performs the Explanation of Benefits (EOB) process. To automate this process and achieve a maturity level 3, the following characteristics need to be implemented: • Standardized, consolidated repository of data from all departments within AHS/DVHA. • Establishing standard EOB response forms resulting from workgroup discussions. These workgroups consist of DVHA staff and representatives from external entities (i.e. Medicare, private payers). • Automated distribution of EOBs via web functionality and other methods of electronic exchange. • Automated sampling process targets selected populations. Responses are automatically tabulated and reported.

Table 18: Operations Management Gap Analysis

OM Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and extend the information model required to properly address the needs and services of the

Medicaid member community and related operations of the Operations Management business area.

OM Evolving Technical Environment

The expectation is that moving to a SOA-based environment will enable the Operations Management area to become more proactive in addressing the proper receipt, editing/auditing, adjudication, payment, and reporting of the claims process, and other operations management processes.

5.6.3 Future Analysis

This section will describe the future environment and provide *conceptual examples* of five business process use cases with business flows and logical service flows representing the concepts for the desired future environments for Operations Management.

The business sub-areas identified by CMS in the MITA Business Framework for Operations Management (refer to Figure 25) are consolidated into eight sub-areas. The 26 business processes shown in the orange boxes in Figure 25 are grouped under the MITA-aligned sub-areas that best represent their functions. The examples provided throughout this section are denoted by the yellow arrows.

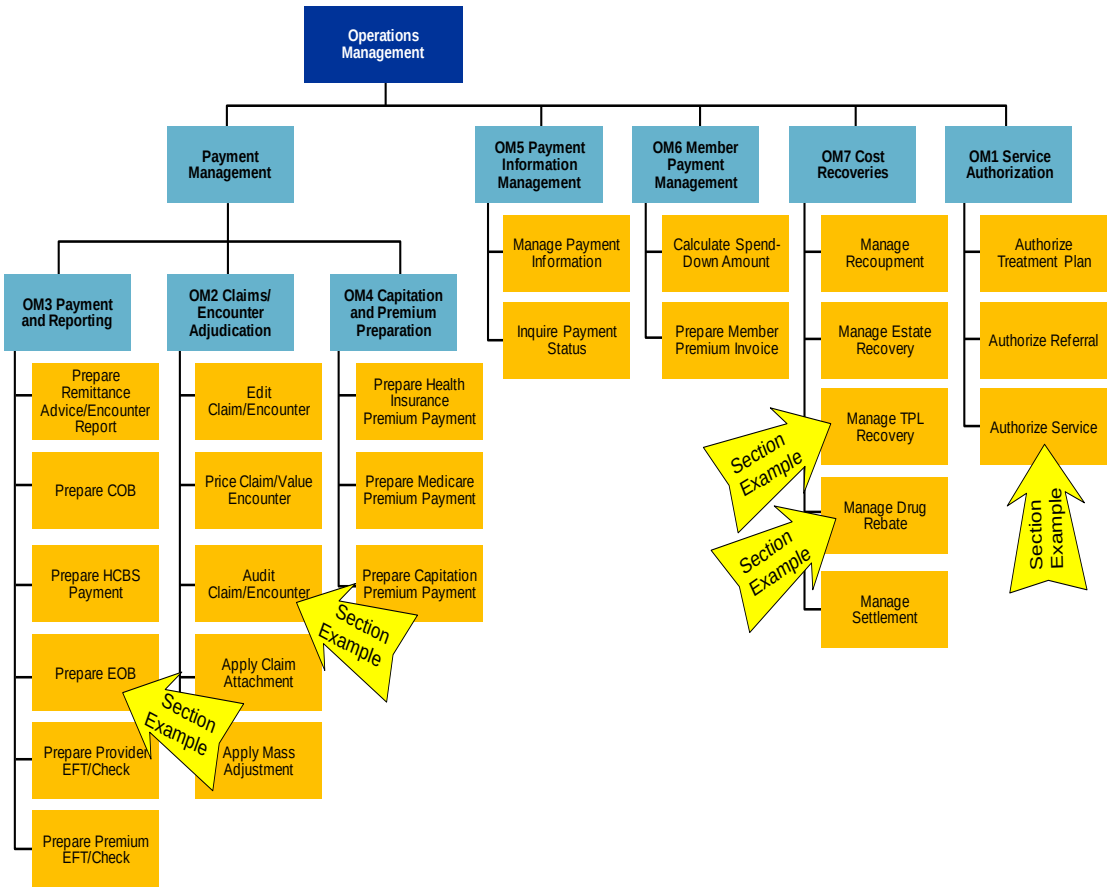


Figure 25: Operations Management Business Framework

This business area focuses on payments and receivables and "owns" all information associated with service payment and receivables. To reach a maturity level of 3, the following need to be implemented:

Audit Claim/Encounter

- Increased utilization of electronic interchange for claims submission
- Creation and maintenance of audits is driven by the rules-engine, allowing for much simpler modifications

Authorize Service

- Web functionality to allow providers to request and review status of prior authorizations
- Flexibility to quickly adjust business rules associated with requiring service authorizations

Manage Drug Rebate

- Standardized, consolidated repository of information across all departments within AHS
- Automated electronic interchanges (interfaces) between agencies and drug manufacturers

Manage TPL Recovery

- Standardized, consolidated repository of information across all departments within AHS/DVHA
- Automated electronic data interchange between AHS/DVHA and other payers

Prepare EOB

- Standardized, consolidated repository of data from all departments within AHS/DVHA
- Establishing standard EOB response forms resulting from workgroup discussions. These workgroups consist of DVHA staff and representatives from external entities (i.e. Medicare, private payers)
- Automated distribution of EOBs via web functionality and other methods of electronic exchange
- Automated sampling process targets selected populations. Responses are automatically tabulated and reported

Additional characteristics for Operations Management obtained from the Visioning Sessions include, but are not limited to, those shown in Table 19.

Operations Management	**SERVICE AUTHORIZATIONS** • Web-based service authorization capability that enables online, real-time entry and determination support • Ability to override authorization decisions with appropriate authority • Ability to change and extend authorizations online • Ability to view full range of services for a beneficiary • **CLAIMS PROCESSING** • Claims processing system decrements service authorizations appropriately • Meets prompt pay requirements • Imaging and scanning capabilities for paper claims and attachments. Ability to view claims and attachments • Ability to interface to provider EMRs (HIE) • Rules-based claims edits and audits that can be easily modified • Workflow in claims modules to allow for distribution and routing of claims processing as directed by client • Claims tracking and digital dashboard reporting to monitor claims adjudication process • Reporting and analytics tools to support claims and financial management • On-demand capability to generate EOBs and RAs • Ability to generate advance payment to providers and recoup payment later, if necessary • Ability to generate claim payment to a beneficiary **RECOVERIES** • Automated exchange of insurer information to support TPL, ESI, HIPP and casualty processes • Case tracking system • Automatically make and verify monthly premium payments • Ability to recoup or withhold portions of the premium payments • Ability to make rush payments or payments on demand when necessary • Correspondence templates • Reporting capability and analytics • Ability to determine cost effectiveness of HIPP and ESI payment / subsidy • Ability to mark claims as recovered • Interface with vital statistics to capture date of death and trigger recovery actions **COB / TPL** • Map TPL recoveries to individual claims and generate accurate 1099s for providers • Automatically create a claim when retroactive COB is determined • Capture drug formularies from other insurers • Capture Medicare Part A & Part B covered services **REFERENCE** • Automated upload and update of all necessary code sets and fee schedules

Table 19: Operations Management – Features

The following Operations Management future business processes are provided as conceptual examples to demonstrate possibilities of how a MITA-aligned solution might be achieved.

OM1 Service Authorization – Authorize Service Future Business Environment

The Authorize Service business process involves a combination of business and technical web services. It encompasses both a pre-approved and post-approved service request. This

business process focuses on specific types and numbers of visits, procedures, surgeries, tests, drugs, therapies, and durable medical equipment. It is primarily used in a fee-for-service setting.

Pre-approval of a service request is a care management function and begins when a care manager receives a referral request data set from an EDI, Paper/Fax, phone, or 278 Health Care Services Review Inbound Transaction Process. Requests are evaluated based on the State's rules for prioritization such as urgency and type of service/taxonomy (e.g., durable medical equipment, speech, physical therapy, dental, out-of-state), validating key data, and ensuring that the requested service is appropriate and medically necessary. After review, a service request is approved, modified, denied or pended for additional information. The appropriate response data set for the outbound 278 Response Transaction, 277 Request for additional information or paper/fax notifications/correspondence is sent to the provider using the Send Outbound Transaction through Manage Provider Communication.

A post-approved service request is an editing/auditing function that requires review of information after the service has been delivered. A review may consist of verifying documentation to ensure that the services were appropriate and medically necessary; validating provider type and specialty information to ensure alignment with agency policies and procedures. Post-approved validation typically occurs in the Edit Claims/Encounter or Audit Claims/Encounter processes.

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Authorize Service business process are shown in Table 20.

CMS MITA Guidelines: Authorize Service	
Item	**Details**
Result	An Authorize Service data set is sent to the: • Send Outbound Transaction process for generation into an outbound transaction • Manage Payment Information process to load authorized referral information needed for payment and service authorization processes. The Payment Information data store would notify and provide record locator index services to the following • Manage Care Case Information process so that the data set is available for the Manage Care Case process • Manage Provider Information process to make the data set available for purposes of responding to provider inquiries about the status of a referral request or a provider's filing of a grievance or an appeal about the referral response. • Manage Member Information process to make the data set available for purposes of (a) assigning covered services to a member under the social service model; and (b) for purposes of responding to applicant or member inquiries about the status of a referral request or an applicant or member's filing of a grievance or an appeal about the referral response.
Shared Data	Provider data store – Provider ID Number Member data store – Eligibility

CMS MITA Guidelines: Authorize Service	
Item	**Details**
	Benefit Package Data Service Data Reference data store- carries diagnosis and procedure code data Communication Data
Constraints	The Authorize Service Request data set must conform to the format and content in accordance with state specific reporting requirements, such as States' HIPA A 277/278companion guides.
Failures	Additional information not received.

Table 20: Business Process for Operations Management – Authorize Service

The MITA business services help to ensure that implementations are interoperable and plug-and-play capable. The Authorize Service business process *conceptual* flow is illustrated in the diagram below (Figure 26).

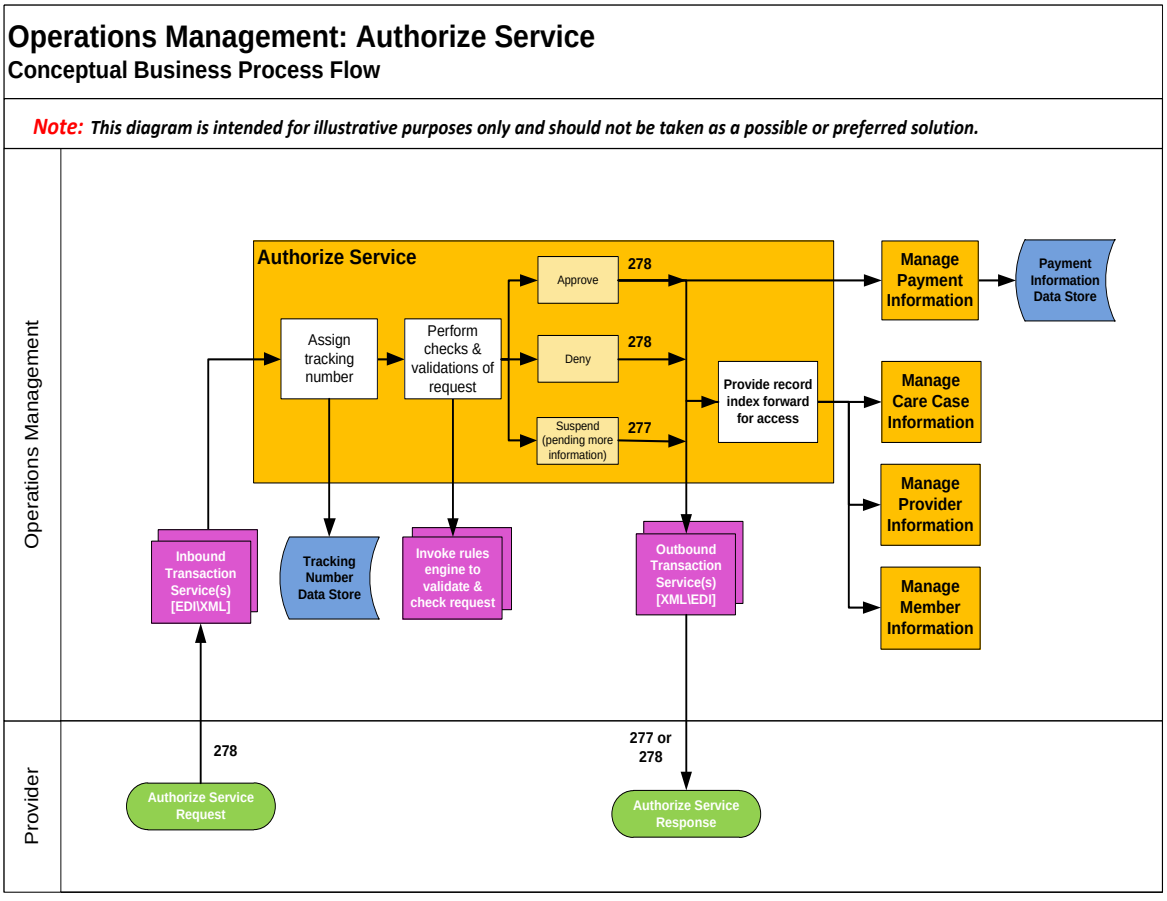


Figure 26: Conceptual Business Process Flow for Authorize Service

OM1 Service Authorization – Authorize Service Future Information Environment

Information specific to each process and/or service is critical to the service offerings, claims processing, recoveries, COB/TPL, reference data, etc. of the Operations Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Provider data store – provider ID number
- Member data store – eligibility
- Benefit package data
- Service data
- Reference data store- carries diagnosis and procedure code data
- Communication data

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

OM1 Service Authorization – Authorize Service Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Authorize Service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Portal Access and Presentation for provider service authorization requests and status
- Form/letter generation and other communication-related services for communicating results.
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Authorize Service flow is illustrated in Figure 27.

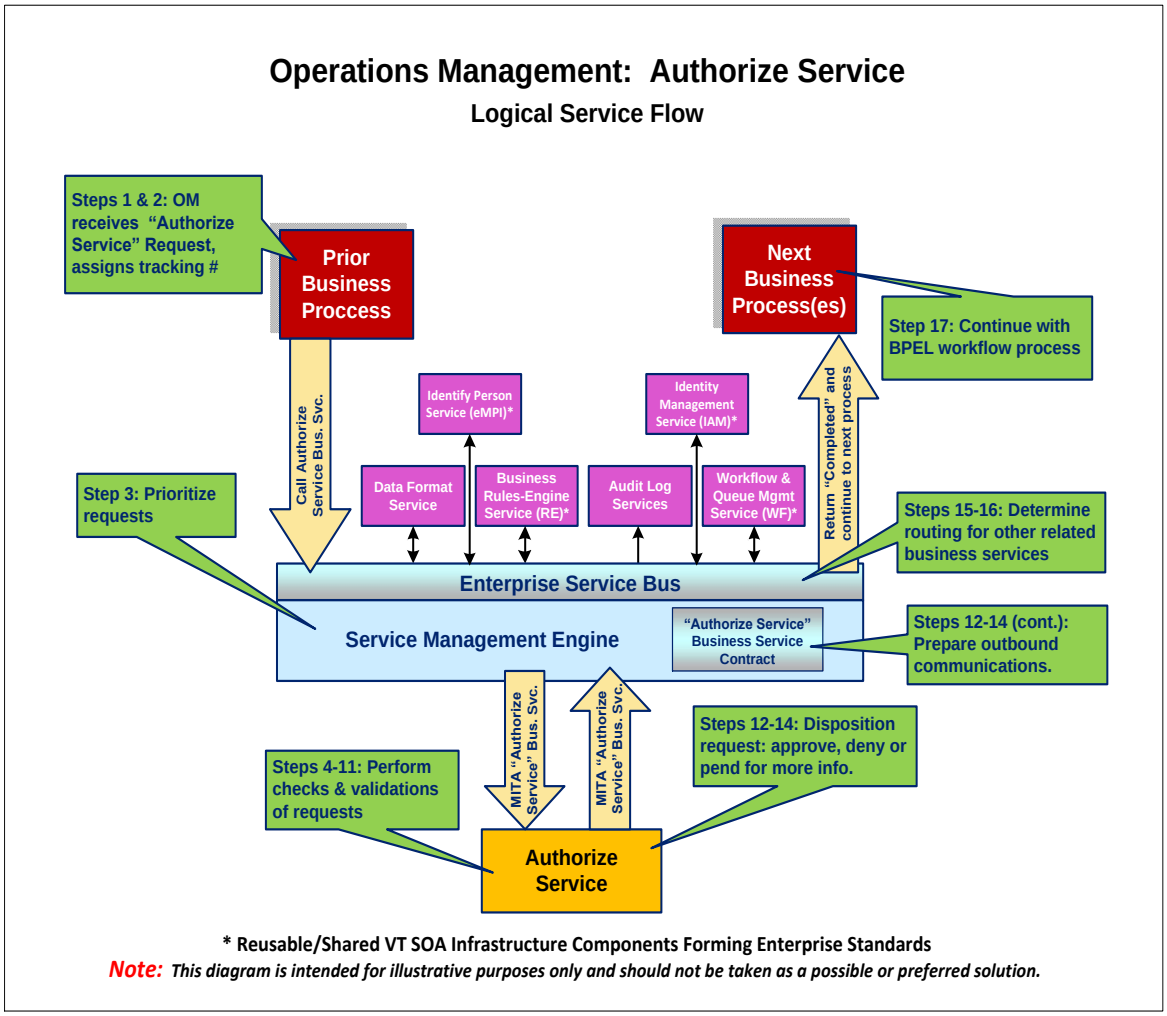


Figure 27: Logical Service Flow for Authorize Service

Figure 27 shows the orchestration of the MITA Authorize Service business service. This scenario demonstrates a provider seeking to verify service authorization and priority for procedures or services to perform. The following represent the steps taken:

1. Pre-approval Authorize Service Process: Receive data set from Receive Inbound Transaction process.
2. Assign a tracking number.
3. Prioritize Service Authorization Request.
4. Validate member eligibility – for social service model, this entails assessing member's health, functional, and socio-economic status.
5. Validate requesting and servicing providers.
6. Validate service coverage and referral requirements.
7. Validate diagnosis code.
8. Validate procedure code.

9. Check for medical or functional necessity and appropriateness.
10. Check against current service authorizations for duplicates.
11. Validate completeness of supporting documentation.
12. Deny based on insufficient/erroneous data or referral for service not medically necessary and send response data set to Send Outbound Transaction process for generation of paper/phone/fax correspondence or an X12 278 Service Review Response.
13. Pend the referral request based on need for additional information – send request for additional information data set to Send Outbound Transaction process for generation of paper/phone/fax correspondence or an X12 277 Request for Additional Information Transaction.
14. Receive additional information from provider.
15. Approve, deny, or request additional information (this process may repeat step 13) related to the referral request (this includes approved with modifications and send approval response data set to Send Outbound Transaction process for generation of paper/phone/fax correspondence or an X12 278 Service Review Response.
16. For social service model, send review result data required for managing member to the Manage Member Information process to be recorded in the member data store as covered service information.
17. For both the social service and medical models:
    - Send review results to the Manage Payment Information process for recording in the Payment Information data store so that it can be accessed during Payment Management and Service Authorization processes.
    - Send record index as notification to Manage Member, Manage Provider, and Manage Case Information so that these processes can access the data set for managing member and provider communications, and for managing care case activities.
18. Start Post-approval Authorize Service Process.

OM2 Claims/Encounter Adjudication – Audit Claim/Encounter Future Business Environment

The Audit Claim/Encounter business process involves a combination of business and technical web services. It receives a validated original or adjustment claim/encounter data set from the Edit Claim-Encounter process and checks payment history for duplicate processed claims/encounters and life time or other limits. This process verifies that services requiring authorization have approval, clinical appropriateness, and payment integrity. Successfully audited data sets are sent to the Price Claim-Value Encounter process. Data sets that fail audits are typically suspended for internal review, corrections, or additional information.

All claim/encounter types must go through most of the steps within the Audit Claim-Encounter process with some variance of business rules and data.

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Audit Claim/Encounter business processes are shown in Table 21.

CMS MITA Guidelines: Audit Claim/Encounter	
Item	**Details**
Result	Successfully Audited claim/encounter data set Rejected claim/encounter data set and Audit error report Suspended e.g. with request for additional information or further review.
Shared Data	Provider Information data: Used in performing prospective program Integrity e.g., HIPDB and Medicare/Medicaid sanctions Member Information data: e.g., member health status data for checking medical appropriateness of services Benefit/Reference Information: e.g., procedures requiring service authorization, units and funding limits for authorized services, life-time limit rules by benefit package Payment History Information : search key data such as ICN, date of service, provider and member demographics, service, and diagnosis codes
Constraints	All claim/encounter types must go through most of the steps within the Audit Claim-Encounter process with some variance of business rules and data. Types include Institutional, Professional, Dental, Pharmacy, and Waiver claims/encounters; Medicare Crossover and Medicare Part D pharmacy claims, COB claims received from payers secondary to Medicaid, e.g., for IHS eligible's; TPL cost avoidance claims and "anticipated" pay-and-chase claims (those required to be paid because of service type). Auditing variances include audits on services
Failures	System failure is the only thing likely to make this business process fail. Failure of audits would result in a natural termination of the business process.

Table 21: Business Process for Operations Management – Audit Claim/Encounter

The MITA business services help to ensure that implementations are interoperable and plug-and-play capable. The Audit Claim/Encounter business process *conceptual* flow is illustrated in the following diagram.

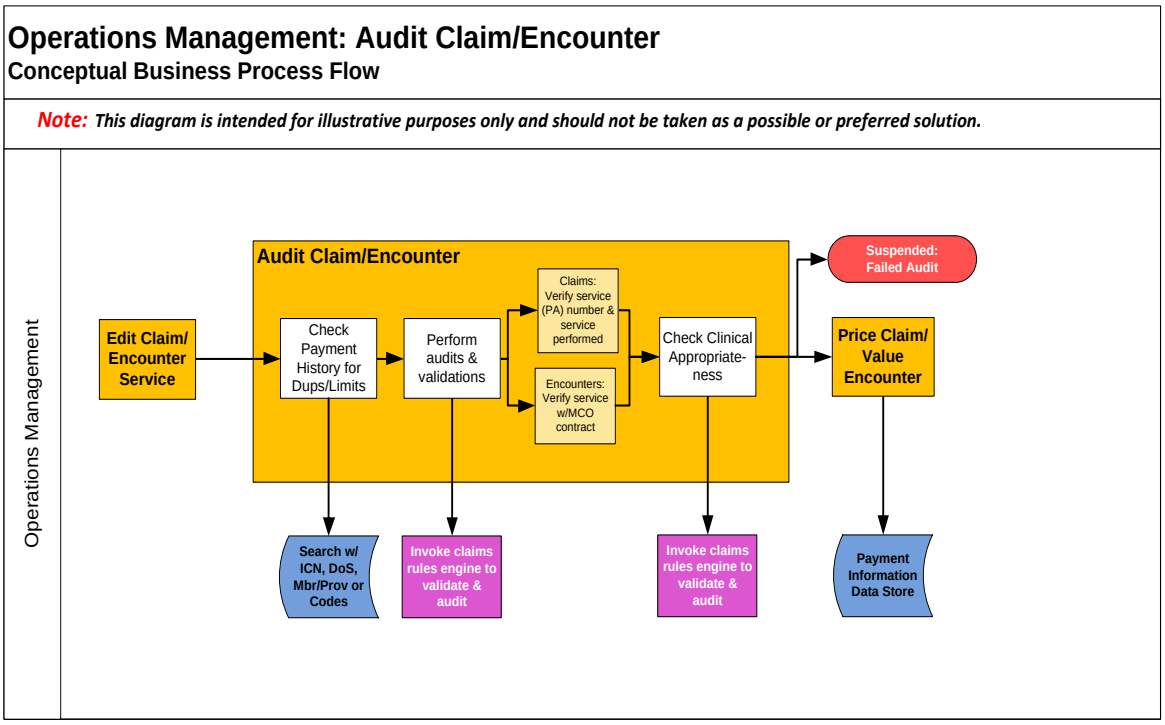


Figure 28: Conceptual Business Process Flow for Audit Claim/Encounter

OM2 Claims/Encounter Adjudication – Audit Claim/Encounter Future Information Environment

Information specific to each process and/or service is critical to the service offerings, claims processing, recoveries, COB/TPL, reference data, etc. of the Operations Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Provider Information data: Used to perform prospective Program Integrity e.g., Health Integrity and Protection Data Bank (HIPDB), and Medicare/Medicaid sanctions
- Member Information data: (e.g., member health status data) for checking medical appropriateness of services
- Benefit/Reference Information: e.g., procedures requiring service authorization, units and funding limits for authorized services, life-time limit rules by benefit package
- Payment History Information: search key data such as Internal Control Number (ICN), date of service, provider and member demographics, service, and diagnosis codes

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

OM2 Claims/Encounter Adjudication – Audit Claim/Encounter Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Audit Claim/Encounter service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Form/letter generation and other communication-related services for communicating results
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Payment Integrity service for integrity check
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Audit Claim/Encounter service is illustrated in Figure 29.

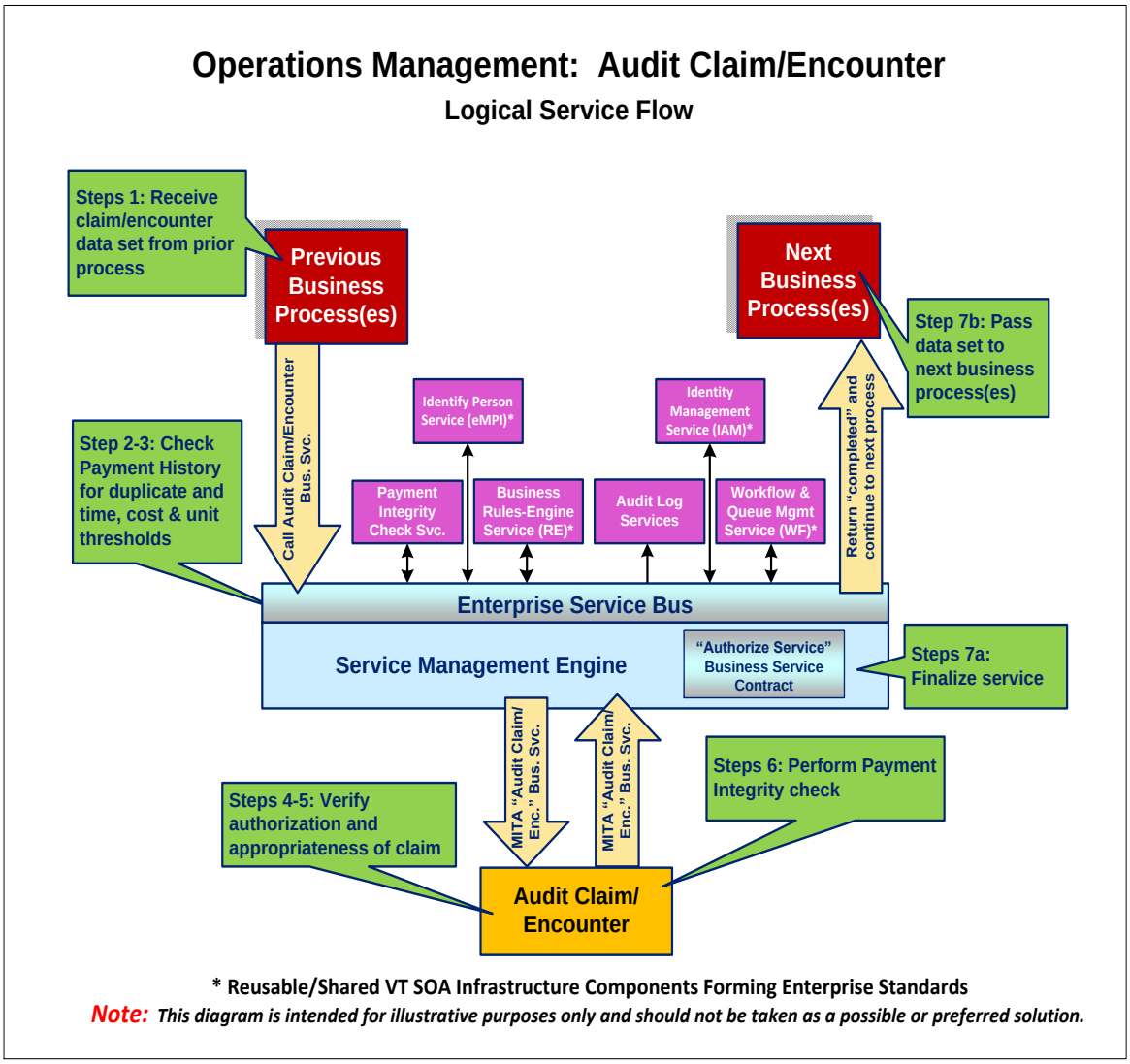


Figure 29: Logical Service Flow for Audit Claim/Encounter

Figure 29 shows the orchestration of the MITA Audit Claim/Encounter business service. This scenario demonstrates the auditing duplication, timeframes, procedures, etc. related to a claim/encounter for a service rendered. The following represent the steps taken.

1. Receive claim/encounter data set from the Edit Claim-Encounter process.

(**Note:** Steps 2 – 6 do not have to occur in a specific order)

2. Check Payment History for duplicate processed claims/encounters using search key data such as ICN, date of service, provider and member demographics, service, and diagnosis codes.
3. Check Payment History for Life Time Limits for services, cost, and units.
4. For Claims: Verify Authorized Service (prior authorization) Number to ensure available units; validate relation to claim and appropriateness of service.

5. For Encounters: Verify the appropriateness of the service authorization against the managed care organization (MCO) contract, e.g., overly stringent service authorization requirement for EPSDT or maternity services that might indicate underutilization practices.
6. Check Clinical Appropriateness of the services provided based on clinical, case, and disease management protocols.
7. Perform Prospective Payment Integrity Check.
8. Send successfully audited claim/encounter data set to the Price Claim-Value Encounter process.

OM3 Payment and Reporting – Prepare EOB Future Business Environment

The Prepare EOB business process involves a combination of business and technical web services. It begins with a timetable for scheduled correspondence and includes producing explanation of benefits, distributing the explanation of benefits, and processing returned EOBs to determine if the services claimed by a provider were received by the client. The EOBs or letters must be provided to the clients within 45 days of payment of claims.

This process includes identifying sample data using random sampling methodology, retrieving the sample data set, preparing the EOBs and/or notification letters, formatting the data into the required data set, which is sent to the Send Outbound Transaction for generation. The resulting data set is also sent to Manage Applicant and Member Communication.

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Prepare EOB business process are shown in Table 22.

CMS MITA Guidelines: Prepare EOB	
Item	**Details**
Result	The EOB data set is sent to the client via the Send Outbound Transaction.
Shared Data	Member data store Payment History
Constraints	The policies and business rules for preparing the EOB sample data set differ by state.
Failures	Data integrity issues.

Table 22: Business Process for Operations Management – Prepare EOB

The MITA business services help to ensure that implementations are interoperable and plug-and-play capable. The Prepare EOB business process *conceptual* flow diagram is illustrated in Figure 30.

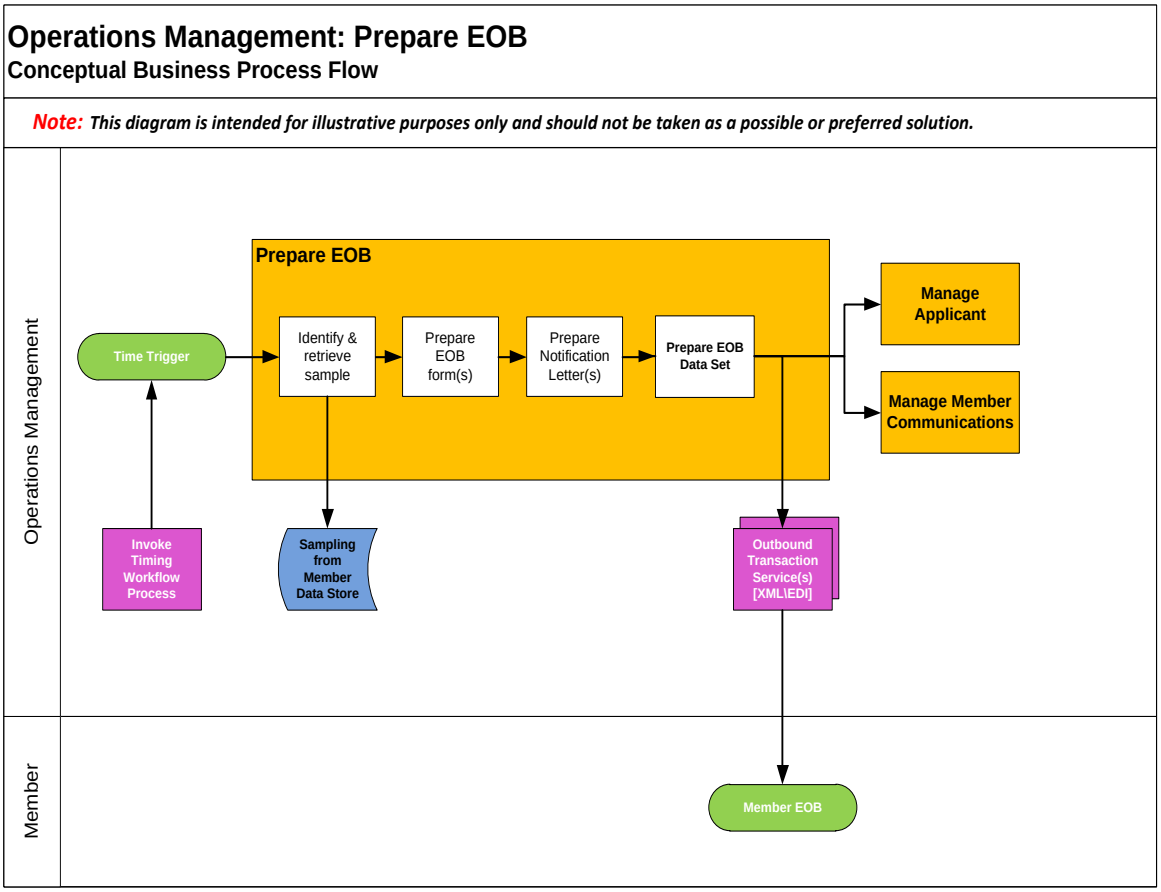


Figure 30: Conceptual Business Process Flow for Prepare EOB

OM3 Payment and Reporting – Prepare EOB Future Information Environment

Information specific to each process and/or service is critical to the service offerings, claims processing, recoveries, COB/TPL, reference data, etc. of the Operations Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Member data store
- Payment history

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

OM3 Payment and Reporting – Prepare EOB Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Prepare EOB service that would meet the State of Vermont expectations:

- Automated administration of user defined rules

- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Form/letter generation and other communication-related services for communicating results.
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

A graphical representation of this solution set for the Prepare EOB service flow is shown below (Figure 31).

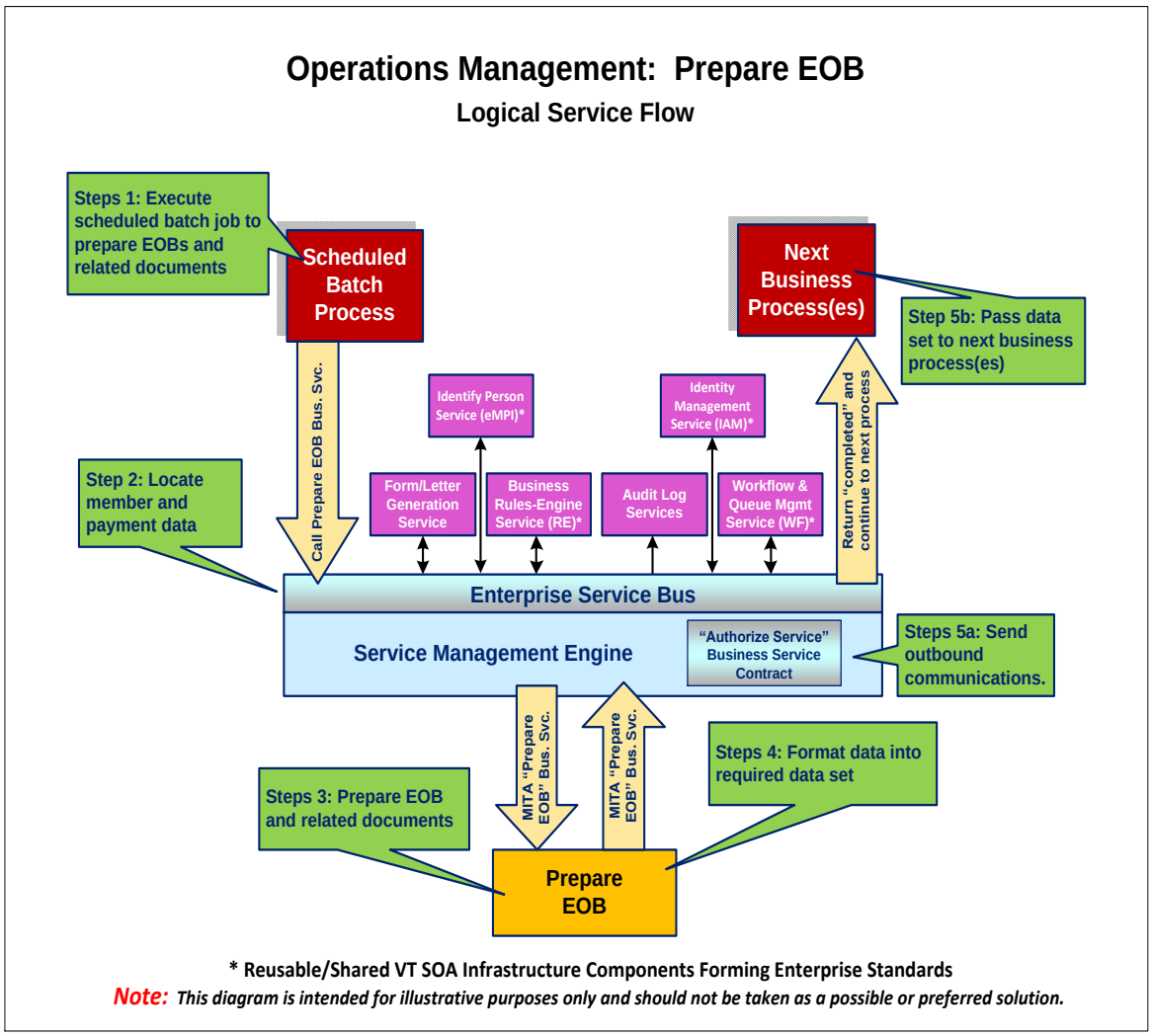


Figure 31: Logical Service Flow for Prepare EOB

Figure 31 shows the orchestration of the MITA Prepare EOB business service. This scenario demonstrates the creation of Explanation of Benefits (EOB) forms, database updates and communications related to a service rendered. The following represent the steps taken:

1. Identify sample selection using random sampling methodology.
2. Retrieve sample selection data.
3. Prepare the Explanation of Benefits and/or notification letters.
4. Format data into the required data set.
5. Send data to the Send Outbound Transaction for generation and to both Manage Applicant and Member Communication for tracking purposes.

OM7 Cost Recoveries – Manage TPL Recovery Future Business Environment

The Manage TPL Recovery business process involves a combination of business and technical web services. It begins by triggering a recovery process, with Third Party Liability data being provided by the Determine Eligibility Process or from some internal/external information through the Receive Inbound Transaction process and identifying the provider and/or TPL carrier related to the claim. It then creates a post recovery file for effected claims sending out notifications to the carrier through the Send Outbound Transaction process or through the Manage Provider Communications process.

Finally, it updates the claim payment through the Manage Payment History process, with appropriate accounts receivable information sent to finance via the Prepare Accounting Functions process. Recovery of these 3rd party liabilities keeps claim costs lower.

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Manage TPL Recovery business process are shown in Table 23.

CMS MITA Guidelines: Manage TPL Recovery	
Item	**Details**
Result	TPL recovery data is sent to the: • Perform Accounting Function process • Manage Payment History process • Provider Communications process
Shared Data	Member Registry Provider Registry Carrier Data Other Agency Data – DMV, Veterans Administration Indian Health Service Immigration and Naturalization Service Fraud case file

CMS MITA Guidelines: Manage TPL Recovery	
Item	**Details**
Constraints	States differ in the rules applied to TPL recoveries. Capabilities related to data matches vary and some states utilize recovery services contractors. Integration of state eligibility information systems with the MMIS also has significant impact on their ability to cost avoid versus cost recover.
Failures	• Inability to identify third party payer from received third party liability data • Identified third party payer denies liability or otherwise refuses to pay

Table 23: Business Process for Operations Management – Manage TPL Recovery

The Manage TPL Recovery business process *conceptual* flow diagram (Figure 32) is shown below.

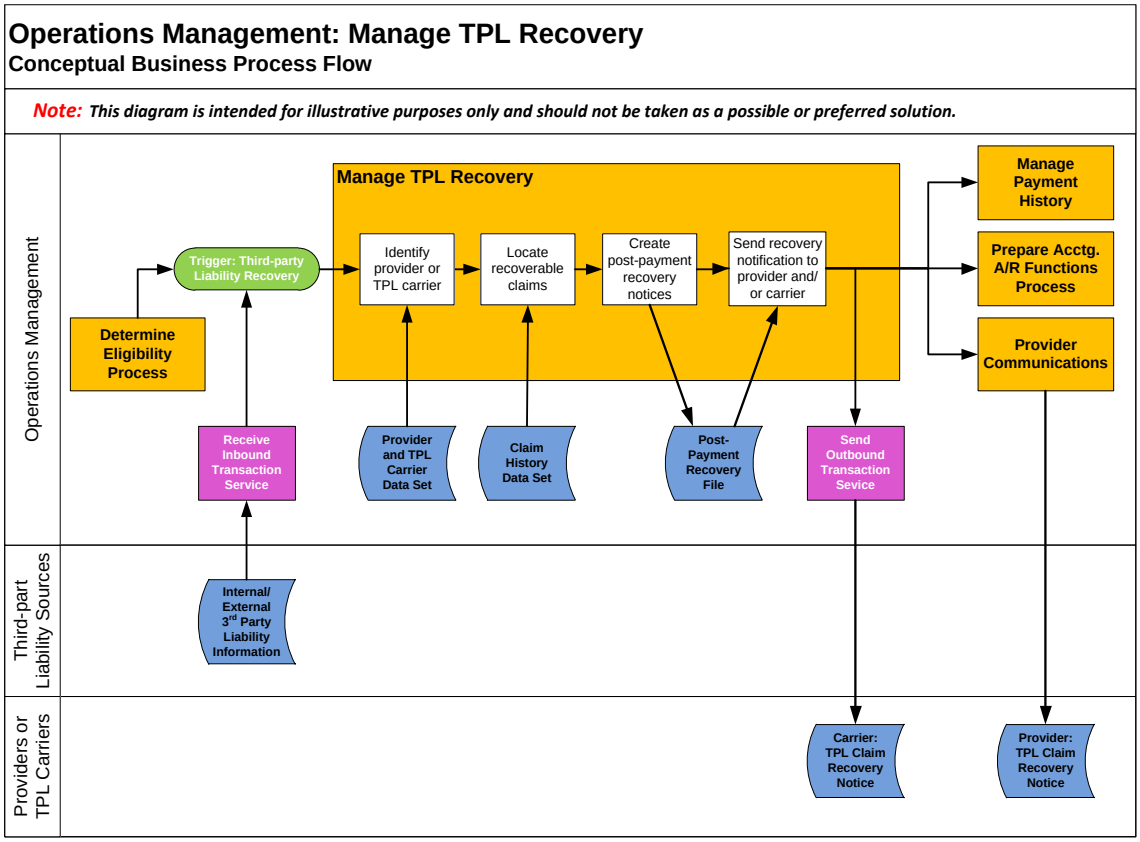


Figure 32 Conceptual Business Process Flow for Manage TPL Recovery

OM7 Cost Recoveries – Manage TPL Recovery Future Information Environment

Information specific to each process and/or service is critical to the service offerings, claims processing, recoveries, COB/TPL, reference data, drug rebate recovery, etc. of the Operations Management business area. This will involve databases and documents in various formats used across the end-to-end processes.

For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Member Registry
- Provider Registry
- Carrier Data
- Other Agency Data – DMV, Veterans Administration
- Indian Health Service
- Immigration and Naturalization Service
- Fraud case file

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

OM7 Cost Recoveries – Manage TPL Recovery Future Technical Environment

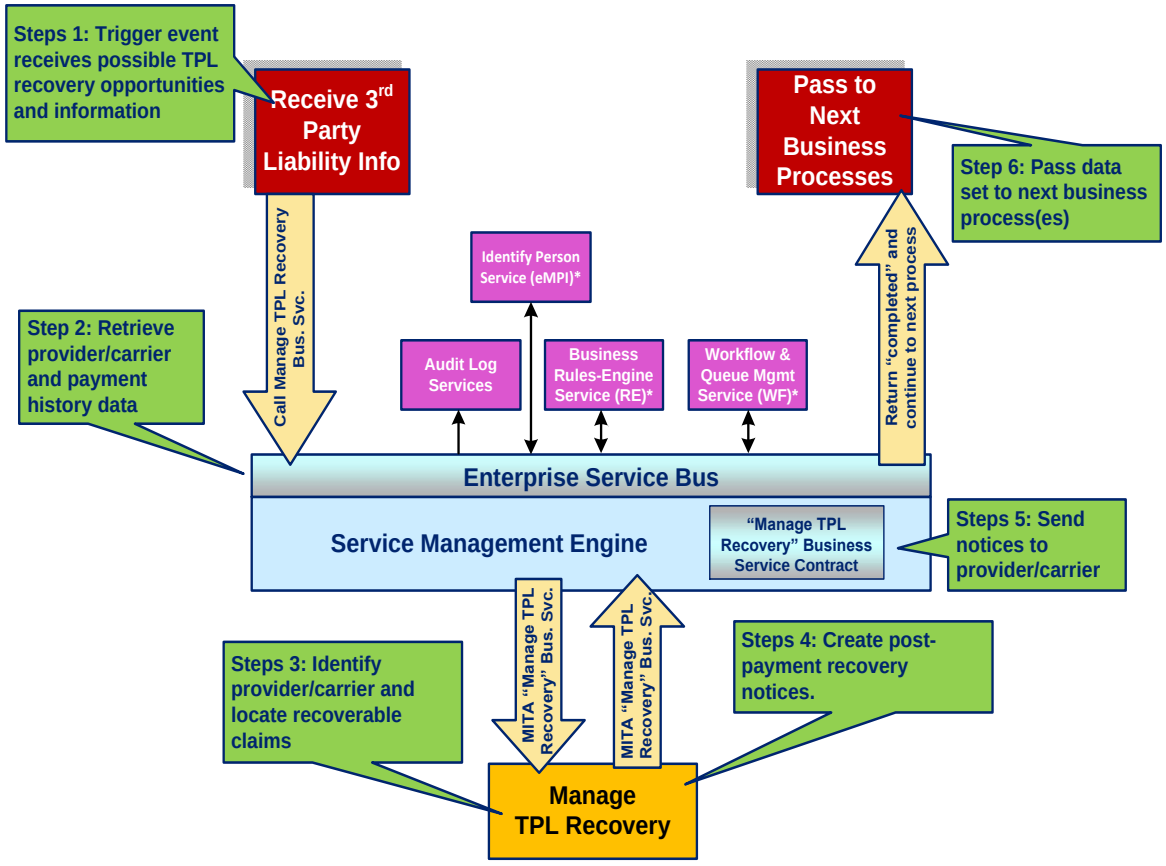
The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Manage TPL Recovery service that would meet the State of Vermont expectations:

- Automated administration of user-defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- SOA-related web services (such as logging) and other SOA components

A sample graphical representation of this solution set for the Manage TPL Recovery service flow is shown in Figure 33.

Operations Management: Manage TPL Recovery

Logical Service Flow



* Reusable/Shared VT SOA Infrastructure Components Forming Enterprise Standards

Note: *This diagram is intended for illustrative purposes only and should not be taken as a possible or preferred solution.*

Figure 33: Logical Service Flow for Manage TPL Recovery

Figure 33 shows the orchestration of the MITA Manage TPL Recovery business service. This scenario demonstrates the determination of any drug rebates from drug claims paid based on CMS drug rebate data and then communicates to entities involved. The following represent the steps taken:

1. Trigger event receives possible TPL information from other business process or from internal/external liability sources of information.
2. Retrieve provider or TPL carrier information from database, along with claim payment history for review.
3. Identify the provider(s), carrier(s) and possibly recipients that may be affected, then locate the related recoverable claims payment records.
4. Create the post-payment recovery data set and the related recovery notices for the provider(s) and/or TPL carrier(s) involved.

5. Send out the recovery notices:
   - TPL carrier notices through the Send Outbound Transaction process.
   - Provider recovery notices through the Manage Provider Communications process.
6. Pass control to next steps: Prepare Accounting Functions process and Manage Payment History process.

OM7 Cost Recoveries – Manage Drug Rebate Future Business Environment

The Manage Drug Rebate business process involves a combination of business and technical web services. It begins by triggering a quarterly timetable for retrieving drug rebate data from CMS through the Receive Inbound Transaction process and comparing drug claims with drug products available for rebates from the manufacturers, then calculating the rebates from the factors provided by the CMS drug rebate file, and finally preparing an invoice and sending it to the manufacturer via the Send Outbound Transaction process, with appropriate accounts receivable information sent to finance via the Prepare Accounting Functions process. The recovery of these drug rebates helps keep costs low. A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Manage Drug Rebate business process are as follows.

CMS MITA Guidelines: Manage Drug Rebate	
Item	**Details**
Result	Drug rebate receivables data set is sent to the Send Outbound Transaction process for generation into an outbound transaction. Drug rebate receivables data is sent to the Perform Accounting Functions process
Shared Data	CMS Unit Rebate Amount (URA) Data Claims Payment History Drug Code Data Manufacturer Data
Constraints	The Manage Drug Rebate process must be in accordance with state specific drug formulary, business rules, and reporting requirements which may differ by state and must comply with federal mandates.
Failures	This process has no failure modes that prevent the process from completion. (**Note:** the process could complete with errors, e.g., errors in rebate rates, drug payment file errors, and these errors or disputed amounts would need to be corrected in the Accounts Receivable process.)

Table 24: Business Process for Operations Management – Manage Drug Rebate

The MITA business services help to ensure that implementations are interoperable and plug-and-play capable. The Manage Drug Rebate business process *conceptual* flow is illustrated in Figure 34.

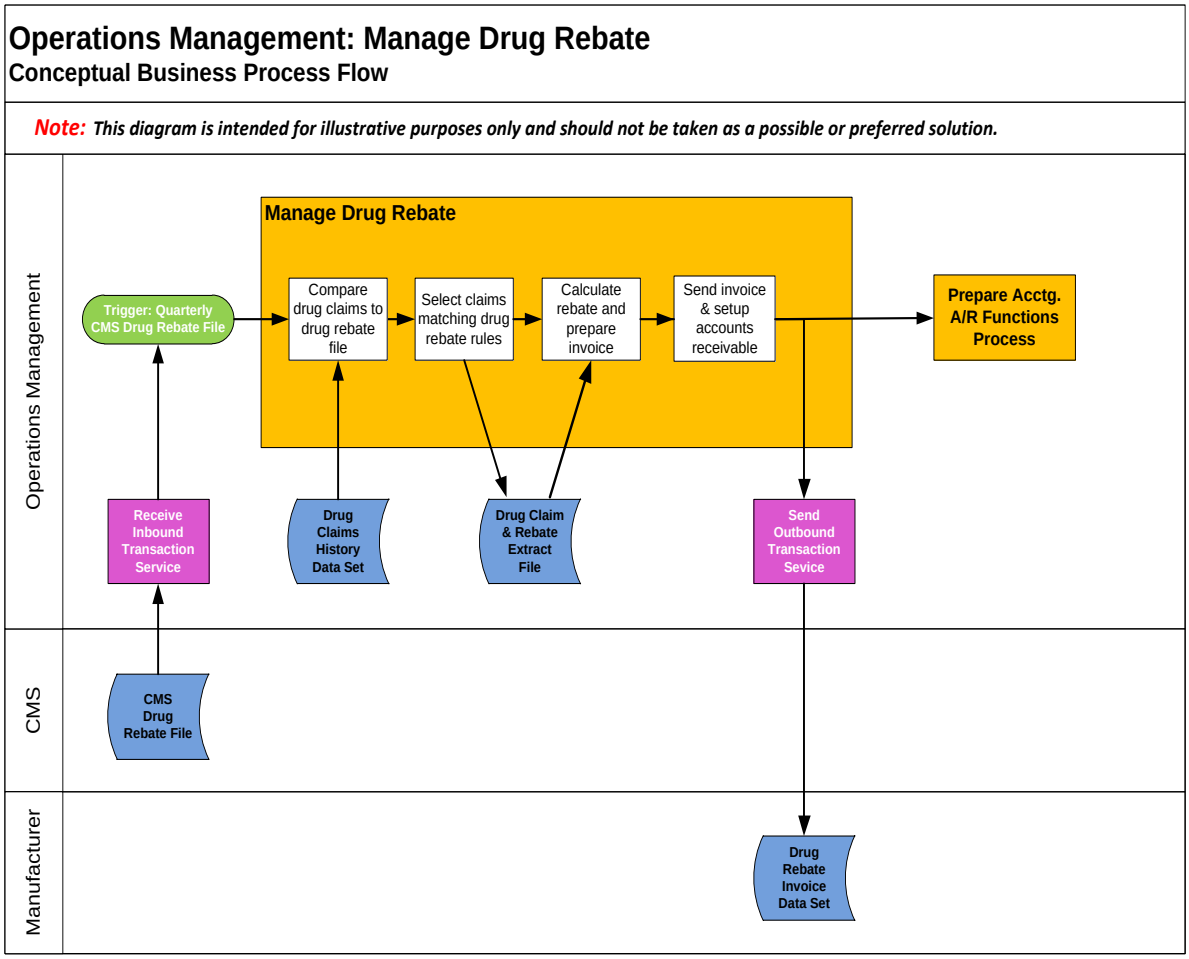


Figure 34: Conceptual Business Process Flow for Manage Drug Rebate

OM7 Cost Recoveries – Manage Drug Rebate Future Information Environment

Information specific to each process and/or service is critical to the service offerings, claims processing, recoveries, COB/TPL, reference data, drug rebate recovery, etc. of the Operations Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- CMS Unit Rebate Amount Data
- Claims Payment History
- Drug Code Data
- Manufacturer Data

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

OM7 Cost Recoveries – Manage Drug Rebate Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Manage Drug Rebate service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Manage Drug Rebate logical service flow is shown below (Figure 35).

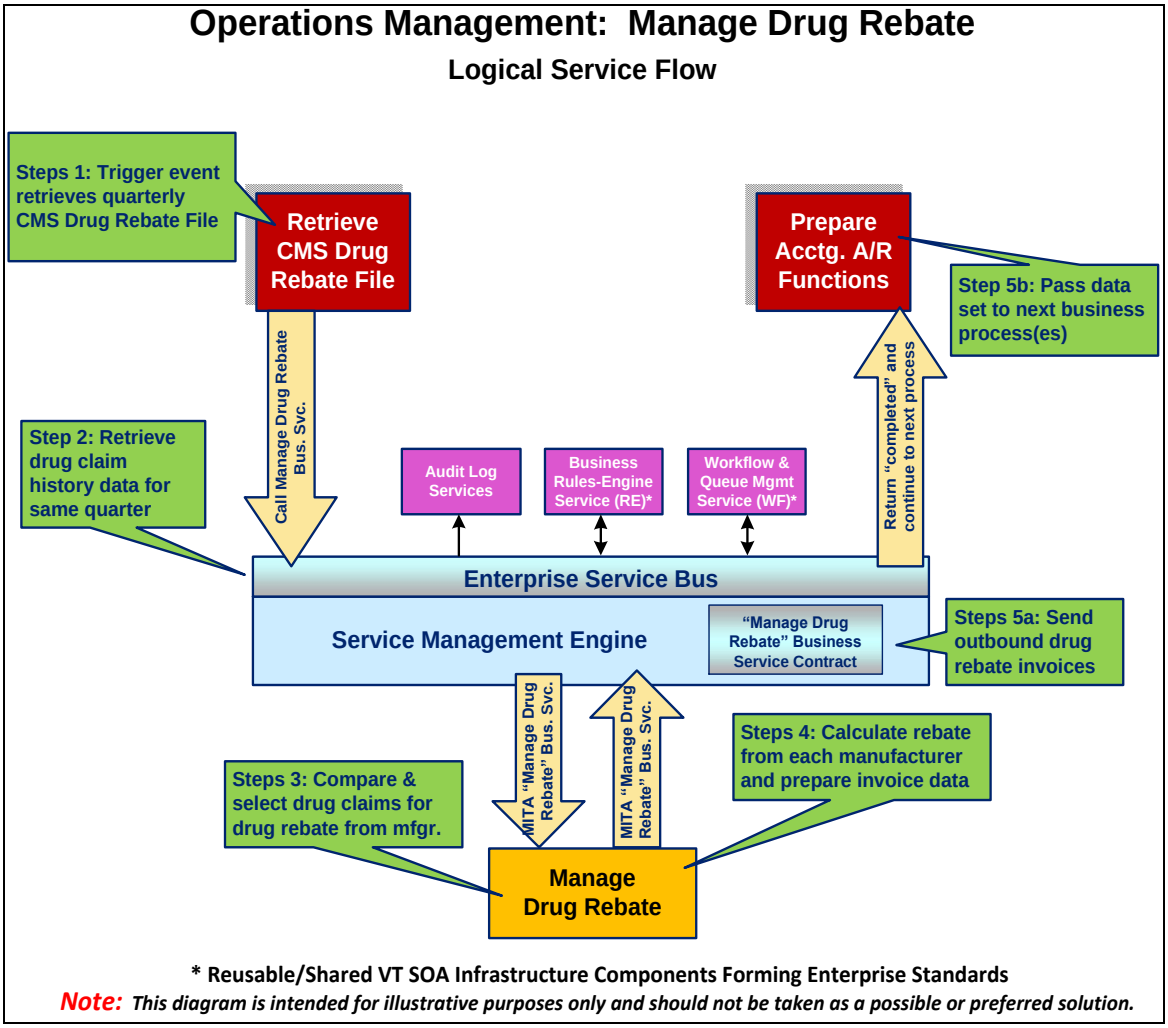


Figure 35: Logical Service Flow for Manage Drug Rebate

Figure 35 shows the orchestration of the MITA Manage Drug Rebate business service. This scenario demonstrates the determination of any drug rebates from drug claims paid based on CMS drug rebate data and then communicates to entities involved. The following represent the steps taken:

1. Trigger the event to retrieve the CMS Drug Rebate File.
2. Retrieve CMS quarterly drug rebate file, containing rebate factors by manufacturer, drug code, and volume.
3. Compare the CMS drug rebate file to the drug claim history extract for the same quarter and select drug claims matching manufacturer and drug code.
4. Calculate the rebate total per manufacturer from CMS-provided drug rebate factors and volume levels, and based on those calculations, generate the invoice for each manufacturer.
5. Send quarterly invoice to appropriate manufacturer through:
    - Send outbound transaction process.
    - Pass control to next step, prepare accounting functions process.

Details for the other operations management business processes are not included in this analysis. These include the following business area/processes:

- ❒ OM1 Authorization
    - Authorize Treatment Plan
    - Authorize Referral
- ❒ OM2 (Payment Management) Claims/Encounter Adjudication
    - Edit Claim/Encounter
    - Price Claim/Value Encounter
    - Apply Claim Attachment
    - Apply Mass Adjustment
- ❒ OM3 (Payment Management) Payment and Reporting
    - Prepare Remittance Advice/Encounter Report
    - Prepare COB
    - Prepare HCBS Payment
    - Prepare Provider EFT/Check
- ❒ OM4 (Payment Management) Capitation and Premium Preparation
    - Prepare Health Insurance Premium Payment
    - Prepare Medicare Premium Payment

- Prepare Capitation Premium Payment

- OM5 Payment Information Management
  - Mange Payment Information
  - Inquire Payment Status
- OM6 Member Payment Management
  - Calculate Spend-Down Amount
  - Prepare Member Premium Invoices
- OM7 Cost Recoveries
  - Manage Recoupment
  - Manage Estate Recovery
  - Manage Settlement

5.7 Program Integrity Management

Program Integrity (PI) Management business activities involve analysis of data collected from the Medicaid enterprise for the purpose of data pattern identification, detection, and investigation of possible misuse and abuse of the program. The Program Integrity business area was formerly termed the Surveillance and Review subsystem in the Medicaid environment. The goal of Program Integrity is to regularly evaluate claim, eligibility, and other data and information, and continually make quality assurance related improvements through identification of the quality and appropriateness of care, fraud and abuse detection, inappropriate payments, and administrative abuses. Providers of service, contractors, trading partners, and beneficiaries are candidates for review and subject to possible administrative, legal, or other Medicaid management controls, based on investigative determinations.

5.7.1 As-Is Analysis

PI As-Is Business Environment

In Vermont, the Medicaid enterprise Program Integrity Management activities cross departments within AHS and include departments in other agencies, including the Department of Education and the Attorney General's Office. The Program Integrity business process also includes coordination and management of outsourced data analysis for retrospective claims reviews using the services of Ingenix, and the External Quality Review Organization related compliance management.

Activities performed by the Program Integrity business area require active fraud and abuse detection, investigation and appropriate disposition, evaluation of service patterns, and management of opportunities for the broader goals of continual quality improvements. In that endeavor, the business area must enlist investigatory research and support across the

AHS departments, DOE, and legal advice and support from the Attorney General's Office. Most of the information captured below was obtained during Visioning Sessions conducted for Program Integrity. The typical activities for this area include:

- Receipt of information from a variety of sources and methods about possible misuse or abuse of the program by providers or beneficiaries;
- Compilation and analysis of claims and other information to perform investigations and determinations;
- Quarterly retrospective analysis of data for utilization patterns and claim/billing and service anomalies. Because of limited internal capacity, Vermont currently sub-contracts with Ingenix for retrospective analysis of data and generation of reports identifying possible areas of questionable activity;
- Management of investigation, summarization of materials and determination of possible misuse or abuse of the program;
- Generation of appropriate correspondence and documentation;
- Referral of suspected fraud and abuse for legal disposition to the Attorney General's Office;
- Management and follow-up with provider education, when indicated;
- Management and follow-up on recoveries when a refund, or payment adjustments are required;
- Management and follow-up administratively when lock-in or lock-out procedures are indicated; and
- Coordination and management of EQRO audits and compliance related improvements.

PI As-Is Information Environment

Currently, the functions of Program Integrity are performed by numerous departments utilizing different sources of data (Figure 36). Some potential cases are investigated through the data stored within ACCESS whereas others are tracked through the MMIS. Additionally, the DSS Profiler and on-demand reports are used to perform investigations. With the implementation of the new MMIS, there are significant opportunities within this area to eliminate redundancy and improve the sharing and timeliness of data. Furthermore, the new system could have the capability to log and track these cases automatically by initiating alerts when records meet certain criteria and allowing cases to be tracked using automated workflow functionality.

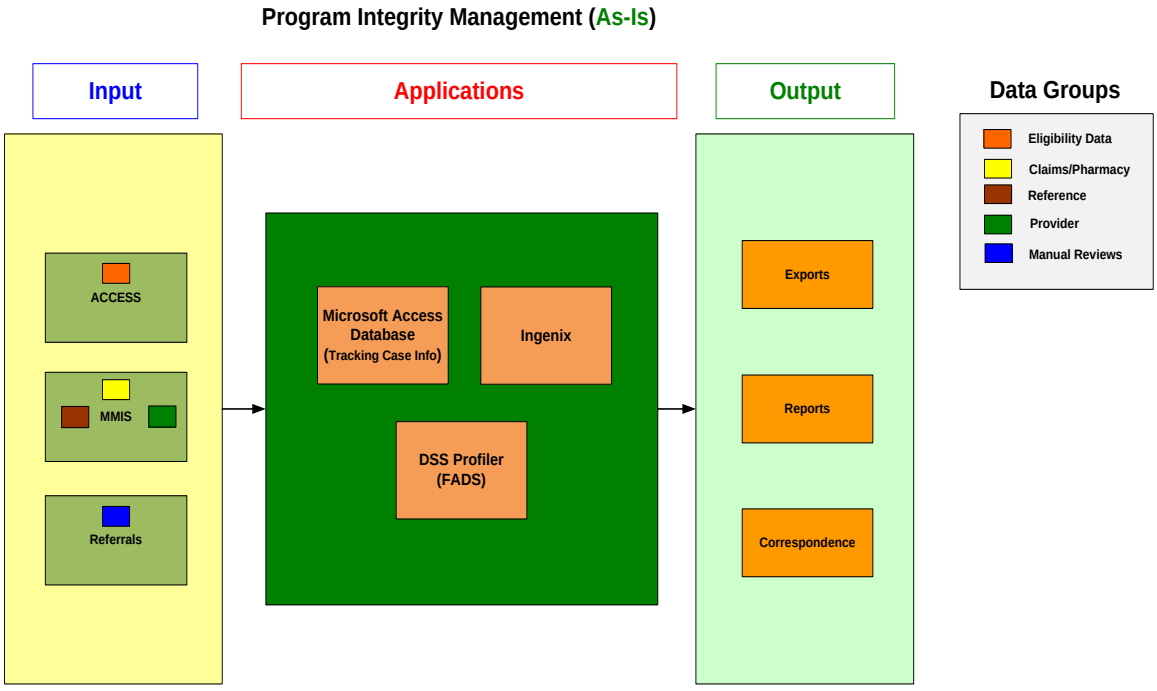


Figure 36: Program Integrity Management (As-Is)

PI As-Is Technical Environment

Program Integrity Management activities in the as-is environment are currently characterized as labor intensive and largely manual processes. Possible candidate case identification can occur via many sources, including:

- Telephone calls, paper referrals, internal Agency-wide referrals based on unusual or suspicious activity, results of random Explanation of Benefit generation to beneficiaries for review, internal reports on drug and medical claims, and Ingenix generated retrospective claim reviews;
- A Microsoft Access database is the primary method used to capture candidate cases and track progress through final disposition;
- Analysis of claims and eligibility additional investigations may require use of multiple databases, included, but not limited to: the eligibility system, ACCESS supported by DCF, the MMIS Business Objects databases including the DSS Profiler, and data from various claims and service databases supported by other AHS departments. It is also sometimes necessary to gather information on contracts, policies and agreements from other departments to verify claims exceptions or billing instructions that may be permitted within those departments; and
- Additional support in the current environment is provided by Ingenix for retrospective review of claims for over-under utilization, and identification of suspicious patterns.

5.7.2 Evolving Analysis

The availability of improved processes and data management will increase productivity and reduce costs with the new MMIS. The evolving MMIS system will be built on the principles and products of a SOA with best-of-breed technologies, loosely coupled services and significant reuse to provide for various needs.

Since the MITA SOA Framework will be a journey for both the State and the vendors, a roadmap will be followed from the current process capability levels (including some manual processes) to the Program Integrity Management MITA level 3 capabilities.

PI Evolving Business Environment

The Program Integrity Management business environment is continually examining methods for program improvement, better identification of candidate cases, improved methods of data analysis and methods for the management of these cases. Program Integrity Management is not currently undergoing any major system enhancements or improvements. However, as Vermont continues to implement innovative health care reform and begins to realize the benefits of a MITA/SOA aligned environment, major enhancements and opportunities will be available.

Table 25, which is an extract from the MITA SS-A documentation, documents the maturity levels associated with the current and future vision of the business processes (Identify Candidate Case and Manage Case) within Program Integrity Management for the Vermont Medicaid enterprise. It identifies the departments that perform these processes and provides a gap analysis for transforming from the as-is state to the desired to-be environment. (**Note**: The maturity level for DVHA is higher than the level identified for other departments within the Agency.) DOE, Ingenix, and the EQRO that provide support and contribute to the business area were not part of the Medicaid gap analysis. The maturity level associated with their support is unknown.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Identify Candidate Case			
DCF, DAIL, DMH, VDH	1	3	The items below list the functionality necessary to continue the progression and achieve maturity level 3. • Standardized queries and automated alerts across AHS/DVHA resulting from the potential identification of cases. • Utilization of standardized sampling and analysis tools to ensure cases that are pursued are complete, accurate and valid. • Ability to record identification activity and inform all departments of status.
DVHA	2	3	

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Manage Case			
DCF, DAIL, DMH, DVHA,VDH	1	3	Currently, the Manage Case process consists of numerous manual components. The related data is manually collected from disparate sources and notes are captured by the department that is currently managing the case. To address the difference between maturity level 1 and maturity level 3, the following modifications will need to be accommodated: • Standardized and centralized data (i.e. service and claims information) across departments enables the tracking of utilization patterns and the subsequent collection of case data. • Automated mechanism for capturing notes and correspondence related to a specific case, which will allow the information to be accessible within AHS/DVHA. • Capability to utilize clinical data for triggering alerts and notices needs to be incorporated. • Customizable, flexible reporting to allow staff at the strategic, tactical, and operational levels to monitor progress and gauge performance.

Table 25: Program Integrity Management Gap Analysis

PI Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and extend the information model required to properly address the needs and services of the Medicaid member community, the integrity of participants and plans, validation and analysis, etc. of the Program Integrity Management business area. There will be evolving solutions that may be proposed as interim solutions on the roadmap to achieving at least the functionality included within MITA's maturity level 3. These solutions will be evaluated by the State for consideration and/or implementation.

Program Integrity Management Evolving Technical Environment

The expectation is that moving to a SOA based environment will enable the Program Integrity Management area to potentially become more proactive in determining fraudulent activities by having either more entry points in the process flow for determining issues and/or becoming quicker at interjecting stops in the stream of processes. These examples of improved investigation management will be made available by the evolving technical environment being implemented.

5.7.3 Future Analysis

This section will describe the future environment and provide process examples with use case documentation including business flows and logical service flows representing the concepts for the desired future environments for Program Integrity Management. The two business processes identified by CMS in the MITA Business Framework for Program Integrity Management are shown in the orange boxes of the diagram below (Figure 37) and will be used as examples within this section.

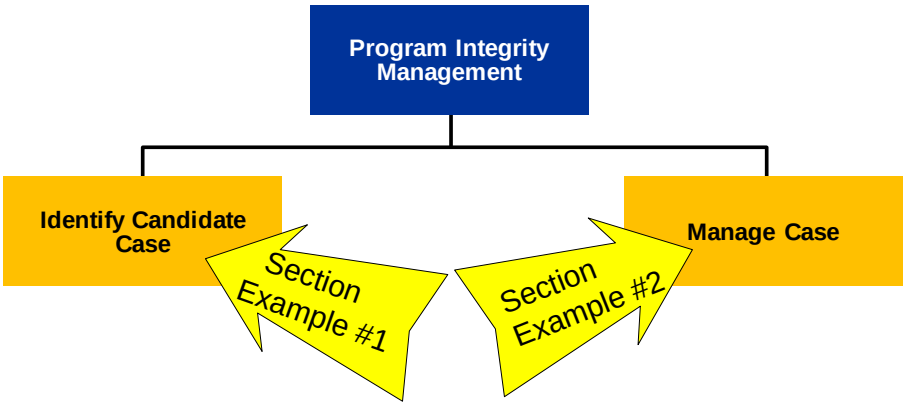


Figure 37: Program Integrity Management Business Framework

To achieve MITA maturity level of 3 or more the environment must support the following minimal functional needs as defined by the MITA Gap Analysis:

- Standardized queries and automated alerts across AHS/DVHA resulting from the potential identification of cases;
- Utilization of standardized sampling and analysis tools to ensure cases that are pursued are complete, accurate and valid;
- Ability to record identification activity and inform all departments of status;
- Standardized and centralized data (i.e. service and claims information) across departments enables the tracking of utilization patterns and the subsequent collection of case data;
- Automated mechanism for capturing notes and correspondence related to a specific case, which will allow the information to be accessible within AHS/DVHA;
- Capability to utilize clinical data for triggering alerts and notices needs to be incorporated; and
- Customizable, flexible reporting to allow staff at the strategic, tactical and operational levels to monitor progress and gauge performance.

Additional characteristics for Program Integrity Management obtained from the Visioning Sessions include, but are not limited to those shown in Table 26.

Program Integrity	• Case Tracking System • Automated external registry / database checking of providers, including CMS notices • Automated checking of claims for fraud and abuse • Internal workflow to automatically assign cases • User configurable alerts and triggers for time sensitive information • Automated sweeping of claims databases to identify potential problems. Rules for sweeping are configurable and flexible • Ability to obtain patient clinical / administrative data from provider EMRs for case investigations (HIE / HIT) • Ad hoc reporting capability, including the ability to extract data • HIPAA Security and Privacy adherence • Automated correspondence tools to generate notices and letters, as necessary • Ability to monitor claims and cases and notify staff when specified claims activity occurs • Ability to mass adjust claims to recoup funds from providers • Automated audit support to select and review claims data • Monitor claims for under- and over-utilization • Decision Support and analytics tools to assess quality of care and services • Support lock-in and lock-out activities

Table 26: Program Integrity Management – Features

The Identify Candidate Case and Manage Case business processes are provided as conceptual examples to demonstrate possibilities of how a MITA-aligned solution might be achieved.

Identify Candidate Case Future Business Environment

The Identify Candidate Case business process uses criteria and rules to identify target groups (e.g., providers, contractors, trading partners or members) and establishes patterns or parameters of acceptable/ unacceptable behavior, tests individuals against these models, or looks for new and unusual patterns, in order to identify incongruent patterns, and outliers that demonstrate suspicious utilization of program benefits.

Candidate cases may be identified by:

- ❒ Provider utilization review
- ❒ Provider compliance review
- ❒ Contractor utilization review [includes MCOs]
- ❒ Contractor compliance review

- Member utilization review
- Investigation of potential fraud review
- Drug utilization review
- Quality review
- Performance review
- Erroneous payment
- Contract review
- Audit Review
- Various reports of suspicious activity from both external and internal Agency sources, and beneficiaries

Each type of case is driven by different State criteria and rules, different relationships, and different data. A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Identify Candidate Case business process are shown in Table 27.

CMS MITA Guidelines: Identify Candidate Case	
Item	**Details**
Result	List of candidate cases Identification of targeted group Record criteria used to select cases or targeted group Background information for each candidate case Update selection rules/criteria if applicable
Shared Data	Member Information Provider Information Payment History Information Benefits/Reference Program Information Case Selection Parameters
Constraints	States and programs within states establish different criteria for their investigations. Rules change along with the experience of the state, health care industry best practices, changes in benefits, new provider types
Failures	Lack of availability of necessary data Lack of automated processes to track, monitor and correspond across the Agency Lack of analytical tools

Table 27: Business Process for Program Integrity Management

The Identify Candidate Case business process *conceptual* flow diagram is illustrated in the diagram below (Figure 38).

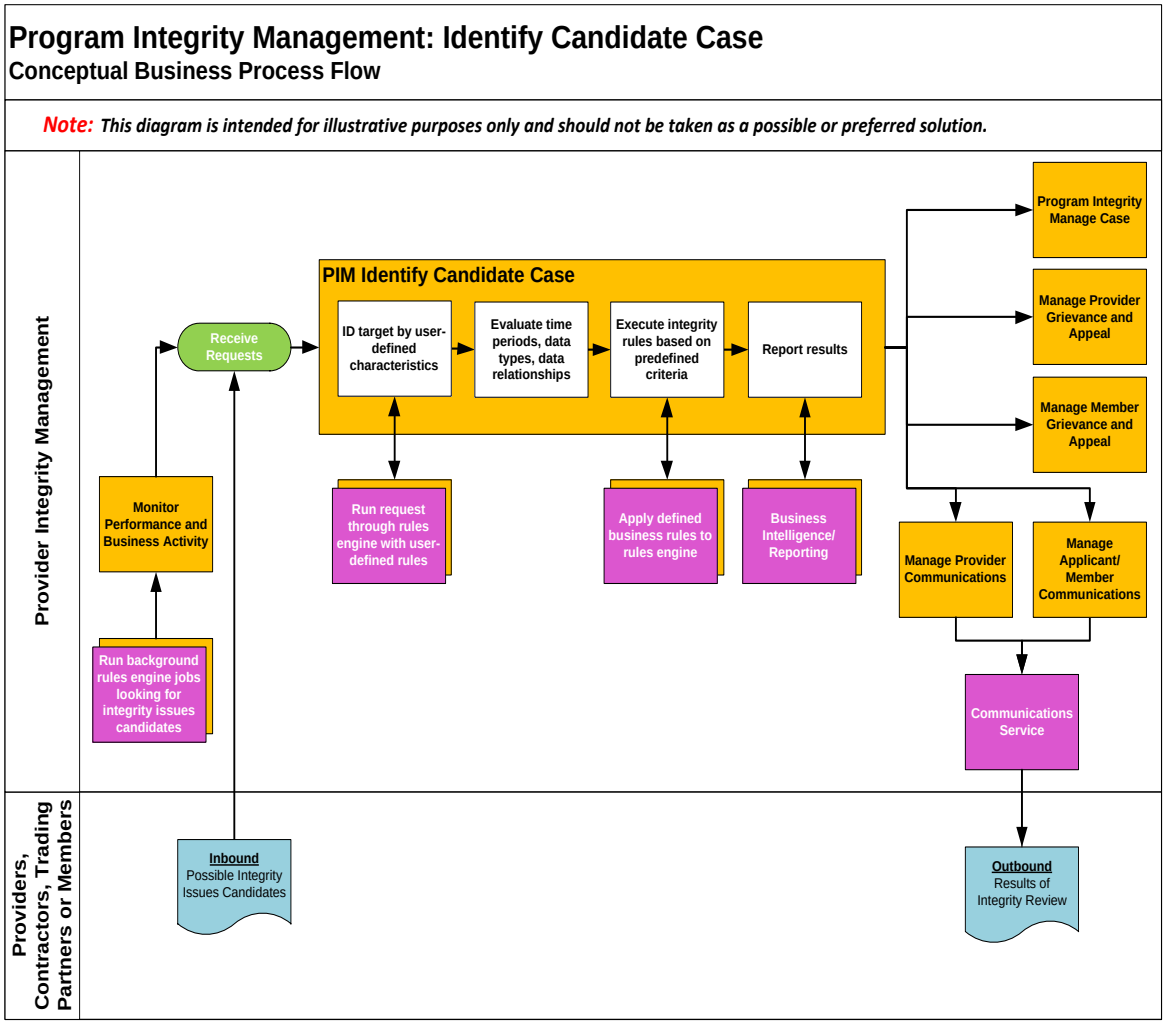


Figure 38: Conceptual Business Process Flow for Program Integrity Management

Identify Candidate Case Future Information Environment

Information specific to each process and/or service is critical to the successful claim tracking, fraud and abuse detection, alerts and triggers, sweeping claims, over utilization, mass adjustments, recoupment, etc. in the Program Integrity Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Member information
- Provider information
- Payment history information

- Benefits/reference
- Program information
- Case selection parameters

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Identify Candidate Case Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Identify Candidate Case service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine (RE) to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow (WF) through business and web services required, with assignment and queue management
- Form/letter generation and other communication-related services for communicating results.
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Identify Candidate Case service flow is shown in Figure 39.

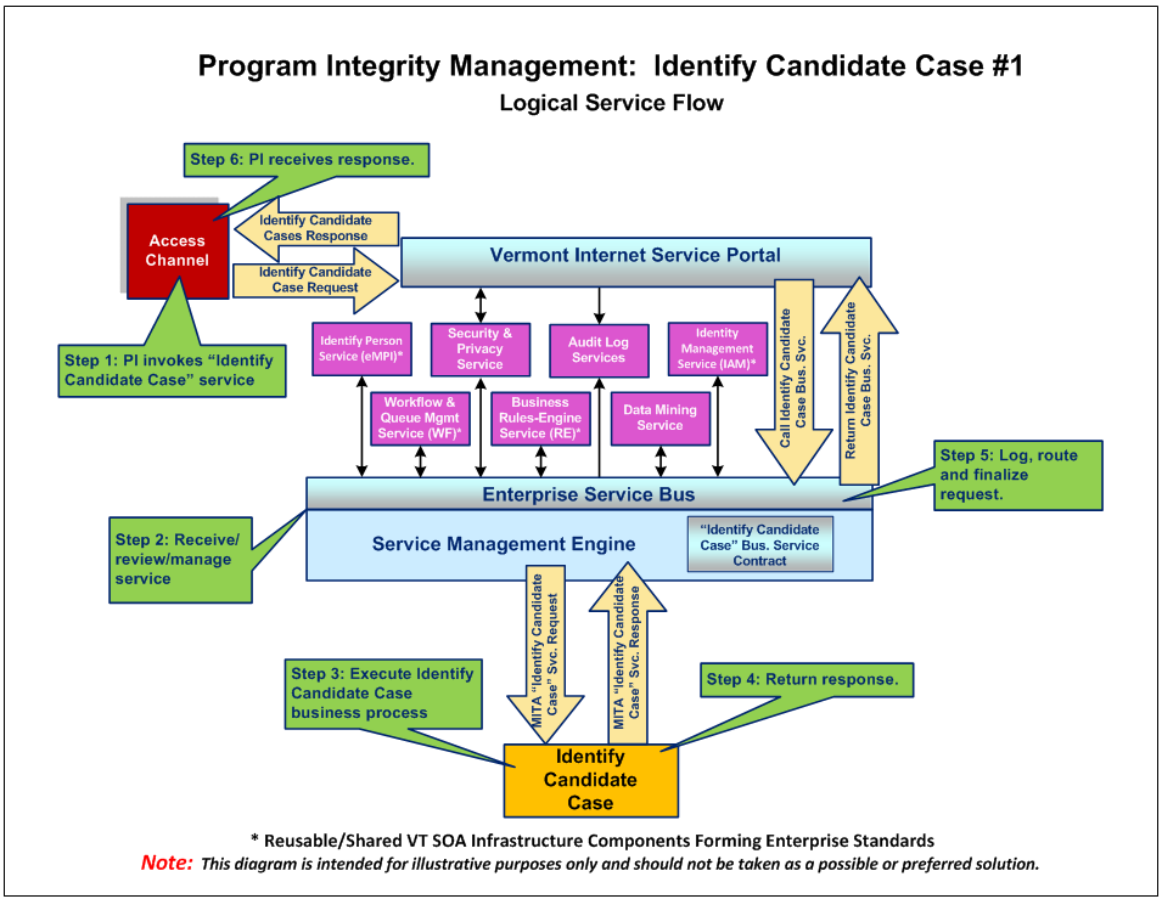


Figure 39: Case # 1 - Logical Service Flow for Program Integrity Management

Figure 39 shows the orchestration of the MITA Identify Candidate Case business service. This scenario demonstrates a State resource invoking the service (Figure 39: Case # 1) or a business engine (Figure 40: Case # 2), with possible data mining activities, searching for fraudulent services, claims, members or providers and providing candidates into a workflow queue for State resource investigation. The following represent the steps taken:

1. Identify target group — Define characteristics of the group in which the search will focus: types of provider, location, types of services, member characteristics, medical conditions.
2. Identify data requirements — Determine selection parameters AND reporting parameters to include items such as time period(s), data elements, data relationships.
3. Identify rules to apply to the data — Select or create rules including specified norms, statistical deviations, types of patterns, Boolean logic, ratios, percentages.
4. Apply rules to targeted group data — Execute rules and record results.

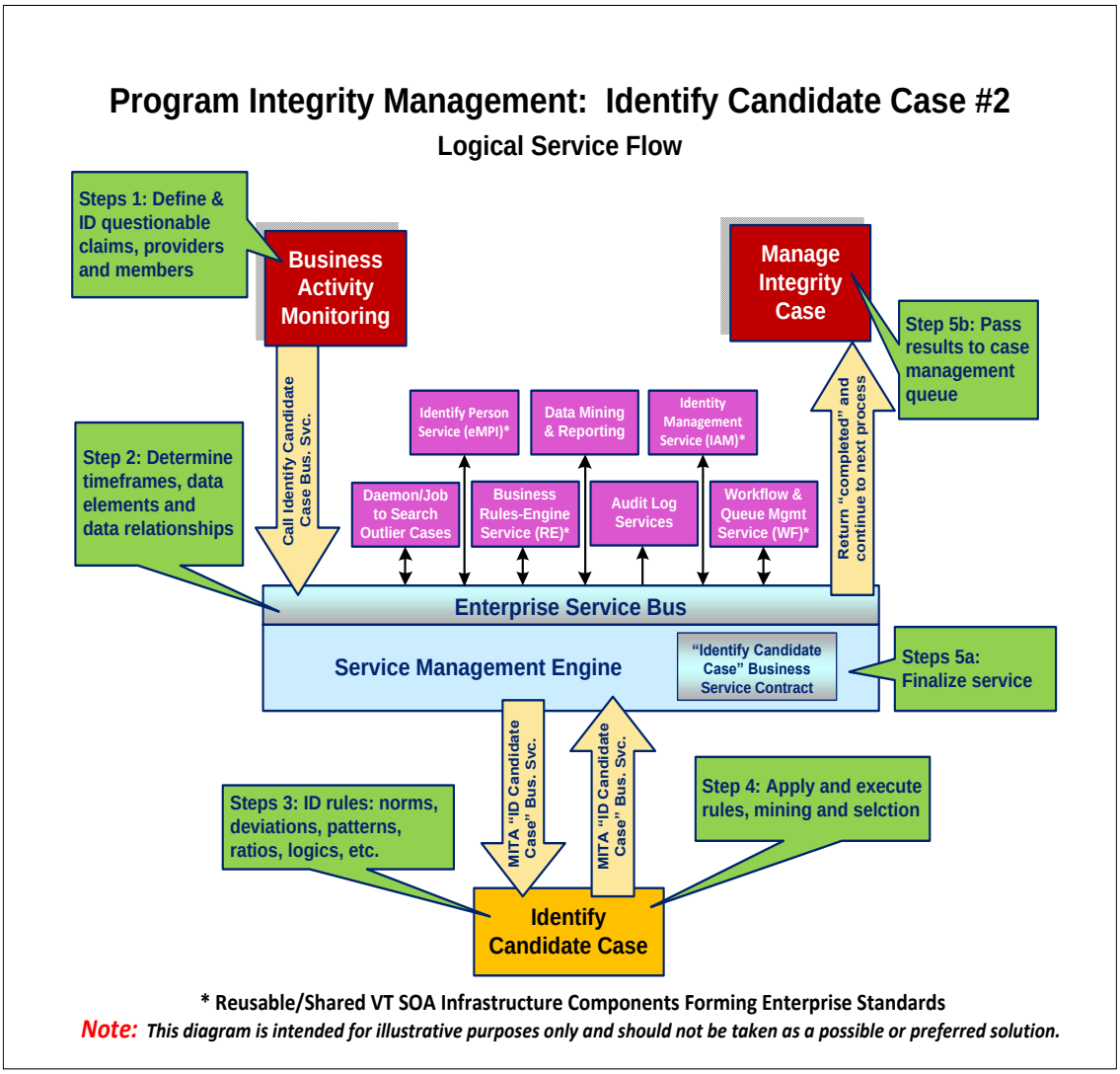


Figure 40: Case # 2 - Logical Service Flow for Program Identity Management

Technical services and information (data) relative to this and other business process samples from this section of the document can be found in the Information and Technical Architecture sections, which present characteristics and capabilities that apply to these domains across business areas.

Manage Case Future Business Environment

The Manage Case business process involves a combination of business and technical web services to investigate and pursue integrity cases for health-related services from providers and programs or State trading partners. The case may result in civil or criminal charges, in corrective action, in removal of a provider, contractor, trading partner or member from the Medicaid program; or the case may be terminated or suspended. A few key general guidelines (results, shared data, constraints, failures) identified by CMS MITA for the Manage Case business process are shown in Table 28.

CMS MITA Guidelines: PIM – Manage Case	
Item	**Details**
Result	Data to update case Disposition of case
Shared Data	Member information Provider information Payment history information Benefits/reference information Program information Medical records requested from providers or provider through Health Information Exchanges
Constraints	States and programs within states establish different criteria for their investigations. Rules change along with the experience of the state, health care best practices, changes in benefits, new provider and member type
Failures	Case is terminated without reaching resolution

Table 28: Business Process for Program Integrity Management – Manage Case

The MITA business services help to ensure that implementations are interoperable and plug-and-play capable. The Manage Case business process *conceptual* flow is illustrated in the diagram below (Figure 41).

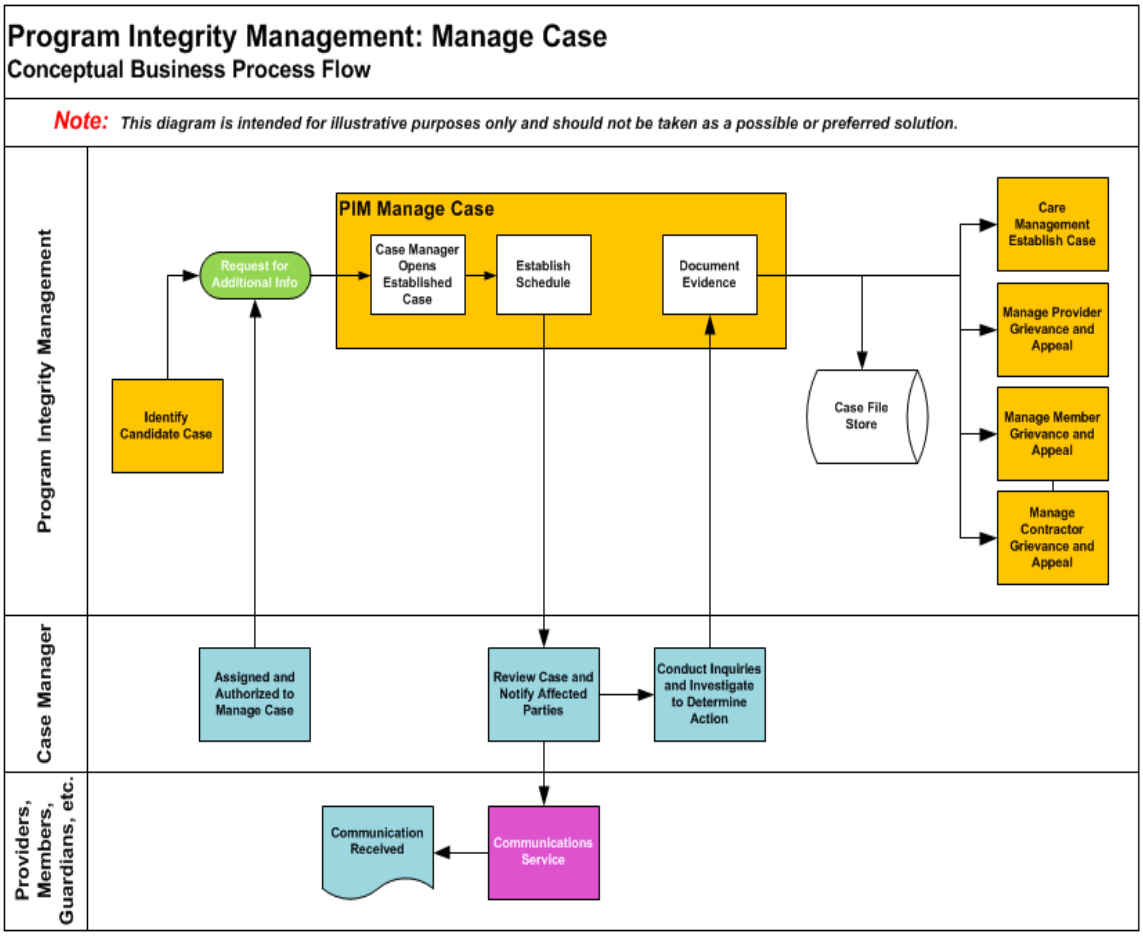


Figure 41: Conceptual Business Process Flow for PI Management - Manage Case

Manage Case Future Information Environment

Information specific to each Manage Case process and/or service is critical to investigating and pursuing integrity cases for health-related services from providers and programs or State trading partners in the Program Integrity Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Member information
- Provider information
- Payment history information
- Benefits/reference information
- Program information
- Medical records obtained from providers or through Health Information Exchanges

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Manage Case Future Technical Environment

Given the previously described guidelines and opportunities, the following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Manage Case service that would meet the State of Vermont expectations:

- Automated case assignments to case managers
- Case workflow framework established
- Automated review of cases and notification of affected parties through correspondence to such as providers, agents, members, guardians, attorneys, etc. to notify of investigations, rights and document requests, including form letter generation
- Automated services to conduct inquiries and investigations for purposes of:
  - Viewing medical records
  - Interviewing members
  - Validating credentials
- Maintain electronic case information and history
- Determination of case status and disposition through automated workflow and business rules engines
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Manage Case service flow is shown below (Figure 42).

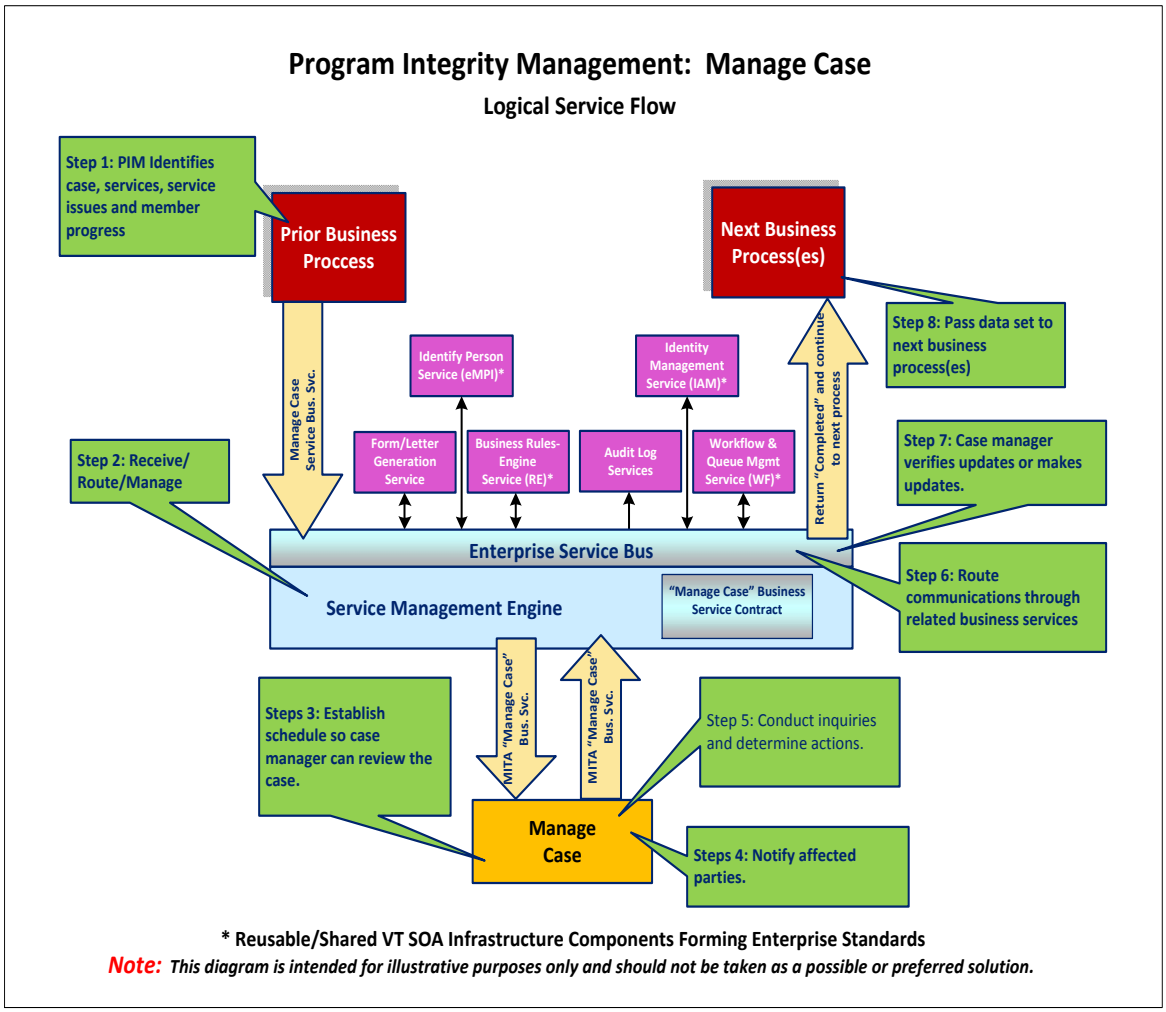


Figure 42: Logical Service Flow for Manage Case

Figure 42 shows the orchestration of the MITA Manage Case business service. This scenario demonstrates a potential investigation or inquiry into the integrity or fraud of a particular claim or service offered, and may investigate members, providers, contractors, trading partners, and others. This scenario shows a potential case manager initiating the process as a State of Vermont Medicaid staff member. The following represent the steps taken:

1. Assign case manager — A case manager is assigned and authorized to manage a case and request additional information.
2. Establish case — The case file is opened, a schedule is added, and a reporting framework is established.
3. Review case — Examine information associated with the case; request more historical information as needed.

4. Notify affected parties — Correspond with providers, members, agents, guardians, attorneys, et al. to notify them regarding the investigation, their rights, and the right of the Medicaid enterprise to request documentation.
5. Conduct inquiries and investigations — Depending on the type of case, different external inquiries will need to be conducted, e.g.:
   - View medical records
   - Interview members
   - Validate credentials
6. Document evidence — Evidence is documented in the case file.
7. Determine action — Based on evidence gathered, a determination is made to close the case.
8. Determine disposition — When research and analysis are completed, the case disposition is reported, e.g., cancel/close case, claim damages or recoveries, identify corrective action, terminate membership in Medicaid program.
9. Track claim recoveries or damages to ensure repayments.
10. Monitor Provider, as determined necessary.

5.8 Program Management

The Program Management (PG) business area activities encompass the strategic planning, policy making, monitoring, financial and quality of service oversight necessary to support the Medicaid program.

5.8.1 As-Is Analysis

PG As-Is Business Environment

Program Management is a cross department/agency administered set of activities that include the overall administrative planning, policy development, program monitoring, and the range of financial activities required for development of budgets, rates setting, on-going financial management, and state and federal reporting. Activities in this business area are guided by the Global Commitment for Care Waiver, the State Medicaid Plan, the State legislature Health Reform Initiatives, CMS, and by state and federal accounting standards and practices.

Typical activities for the Program Management area currently include:

- ❒ Accounting functions, payables and receivables, reconciliations, and 1099 generation.
- ❒ Development and management of benefits service packages, benefit design, and formulary development.
- ❒ Management of rate setting functions with participation of outside data aggregators and independent actuarial support.

- Developing budgets and management of state funds.
- Managing federal financial participation for the Global Commitment Waivers, including required enrollment counts, cost saving and, other required reporting.
- Managing federal medical assistance percentages (F-Map).
- Development and maintenance of AHS goals and initiatives.
- Development and management of program policy and State Plan.
- Maintenance of benefit and reference information.
- Generation of financial/program analysis reporting that meets state and federal requirements.
- Development and management of performance measures and monitoring of performance.

PG As-Is Information Environment

The data necessary to support the functions contained within Program Management (shown in Figure 43) is stored within a number of systems across the Agency. The main components currently being performed are the sharing and syncing of this information between ACCESS, the MMIS, and SAMS. The resulting information is then passed to VISION for financial processing aspects.

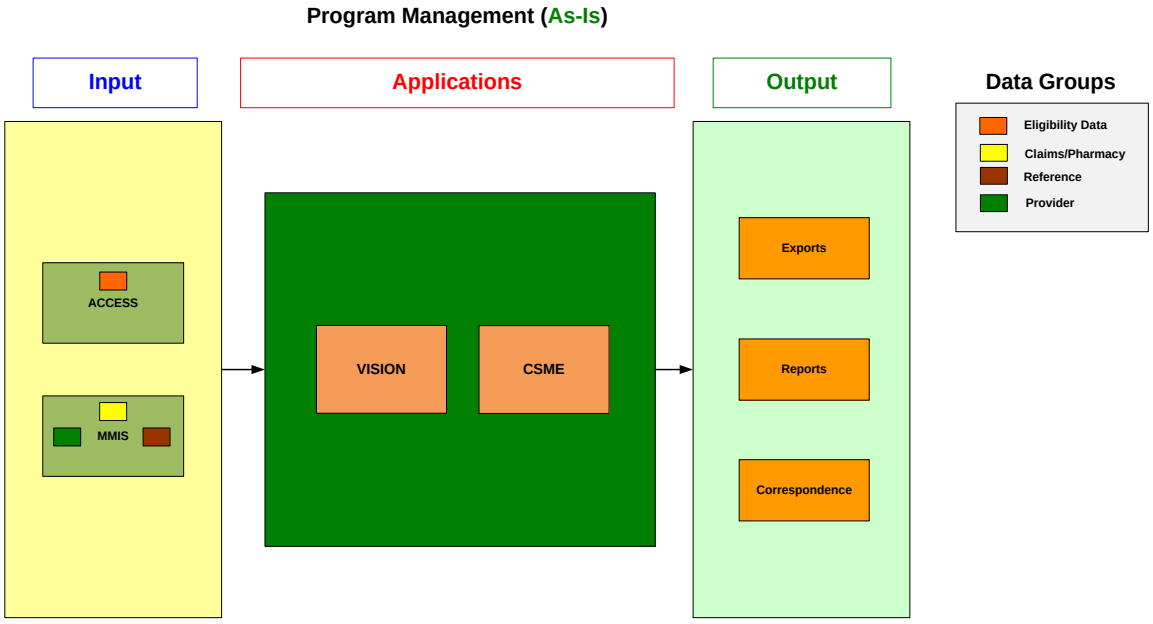


Figure 43: Program Management (As-Is)

PG As-Is Technical Environment

Program Management activities in the as-is environment are currently a largely manual process involving the development and maintenance of benefits packages, policy and procedures, and comprehensive financials used to set rates, define program impacts, and develop budgets.

In the current environment many of the activities in this area are performed across AHS. The policy, procedures, planning, and other activities are primarily managed using MS Office tools, websites, and shared network directories. Financials are managed by each department, AHS Central Office, and with the State Treasury's accounting system with Medicaid payables and some receivables generated from the MMIS. Some payables and receivables are also captured from the DCF ACCESS system for program, such as VHAP and Medicare Buy-in. Reporting is managed from the MMIS database, various data warehouse environments and manipulated using MS Office tools, SPSS, and other software. The rate setting activities for the Agency are performed with the aid of a data aggregation company, PHPG, and the independent actuarial support is provided by AON. Nursing Home rates are set by the AHS Division of Rate Setting.

5.8.2 Evolving Analysis

The Program Management business area will evolve to MITA level 3 capabilities outlined below.

PG Evolving Business Environment

Because of the imminent replacement of the MMIS system, the Program Management business area is not currently undergoing any major system enhancements or improvements.

Table 29 documents the maturity levels associated with the current and future vision of the sample business process (Develop and Maintain Benefit Package) for the Vermont Medicaid enterprise. It identifies the departments that perform the business process and provides a gap analysis for the business of the differences between the as-is and to-be environments.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Benefit Administration – Develop & Maintain Benefit Package			
DCF, DAIL, DMH, DVHA, VDH	2	3	There is some degree of automation within the Develop and Maintain Benefit Package process, specifically related to the waiver programs, which permit more flexibility around selection of services and providers within a benefit package. To achieve a maturity level 3, the following items need to be

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
			addressed: • All programs introduce flexibility within benefit packages, enabling "consumer driven" health care. This provides consumers with more choices among services and provider types within the prescribed funding limits. • Increased use of electronic health records leads to more flexible, effective creation of benefit packages. • Functionality needs to include the ability to quickly modify benefit packages and service offerings. These modifications will be based on 'predictive' analysis utilized to determine potential impacts.

Table 29: Program Management Gap Analysis

PG Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and extend the information model required to properly address the needs and services of the Medicaid member community in development, delivery, and funding of programs of the Program Management business area. There will be evolving solutions that may be proposed as interim solutions on the roadmap to achieving a MITA maturity level 3 or higher.

PG Evolving Technical Environment

The expectation is that moving to a SOA-based environment will enable the Program Management area to become more proactive in properly addressing the various care programs, etc. critical to the effective delivery of services and care to members. These examples of improved communications and governance will be made available by the evolving technical environment being implemented.

5.8.3 Future Analysis

This section will describe the future environment and provide a *conceptual example* of one process use case with a business flow and logical service flow representing the concepts for the desired future environments for Program Management.

The business sub-areas identified by CMS in the MITA Business Framework for Program Management (see Figure 44) are consolidated into six sub-areas, shown as light blue boxes. The 17 business processes (shown as orange boxes) are grouped under the MITA-aligned sub-areas that best represent their functions.

The example described in this section is denoted by the yellow arrow.

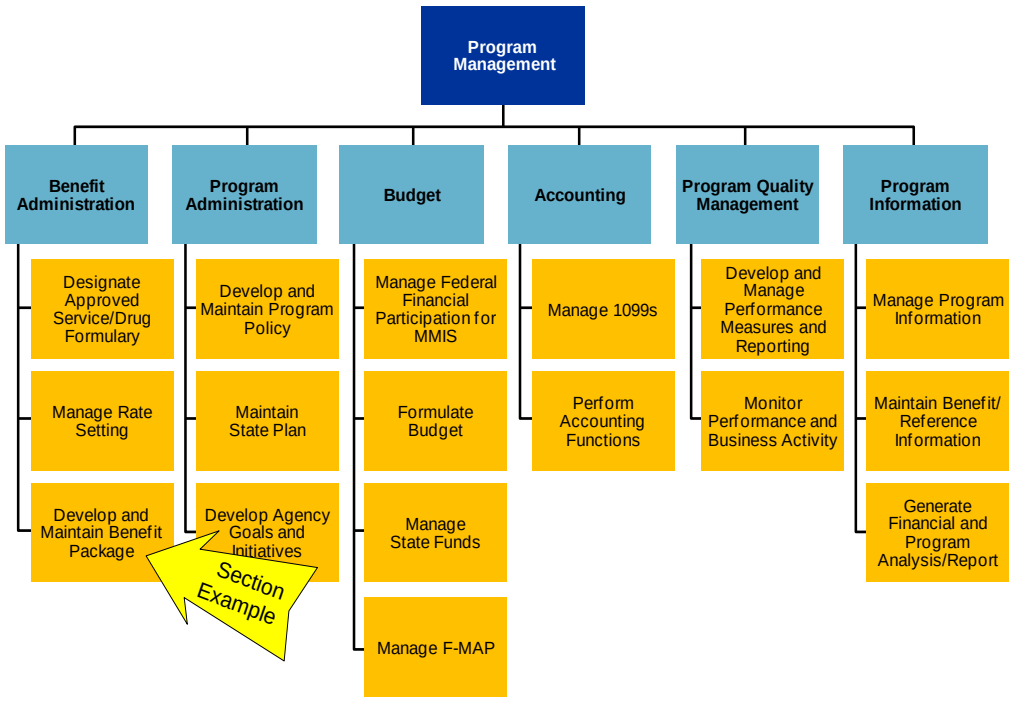


Figure 44: Program Management Business Framework

Achieving the goal of migrating to MITA-aligned business processes, such as for the example, Develop and Maintain Benefit Package, with a maturity level of 3 or more is the future goal for Vermont's Program Management business area. The environment must support the following minimal functionality as defined by the MITA Gap Analysis:

- All programs introduce flexibility within benefit packages, enabling "consumer driven" health care. This provides consumers with more choices among services and provider types within the prescribed funding limits.
- Increased use of electronic health records leads to more flexible, effective creation of benefit packages.
- Functionality needs to include the ability to quickly modify benefit packages and service offerings. These modifications will be based on 'predictive' analysis utilized to determine potential impacts.

Additional characteristics for Program Management obtained from the Visioning Sessions include, but are not limited to, those shown in Table 30.

Program Management	• Unlimited fund codes • Capture and maintain fund codes and generate reports based on fund codes • Capture all claim (service) and financial information in one system • Generate on demand payment cycles to facilitate rapid payments to providers and beneficiaries • Manage drug rebates • Ability to tie Federal Reimbursement rate to each service and program • Ability to pay multi-department service claims and apply and report costs against the multiple fund sources • Generate Fund Balancing Reports (FBR) • Ability to generate all Federal and State reports including CMS 21, CMS 64, CMS 37, et.al. • Ability to generate accurate enrollment reports • Ability to report offsets of costs incurred and budgeted dollars by fund code • Ability to generate budget trend reports • Ability to build budget using data from system • Automated, bidirectional exchange of financial data with Vision and other systems • Ability to generate incentive payments based on AHS defined parameters • Ability to meet Cash Management Act financial reporting standards • Ability to track grant funds expended for services to beneficiaries • Ability to support actuarial rate setting activity through data extracts and reporting tools • Ability to validate and replicate independent rate setting processes • Ability to monitor performance against the actuarial rates and assumptions • Ability to initiate mass claims adjustments with rate changes • Ability to load Medicare fee schedule • Web-based repository for agency information • Ability to access and search policies & procedures, state plans, strategic plans, benefit plans and other program information • Accommodate benefit packages with tiered in/out of network services • Provide capacity to perform program / benefit modeling to analyze benefit packages; ability to model benefit packages and evaluate impact and cost

Table 30: Program Management – Features

The future Benefit Administration, Develop and Maintain Benefit Package business process is provided as a conceptual example to demonstrate the possibilities of a MITA-aligned environment.

Benefit Administration – Develop and Maintain Benefit Package Future Business Environment

The Develop and Maintain Benefit Package business process involves a combination of business and technical web services. It receives:

- Requests for contract verification from authorized providers, programs, or business associates
- Performs the inquiry
- Prepares the response data set for the send outbound transaction process

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Develop and Maintain Benefit Package business process are shown in Table 31.

CMS MITA Guidelines: Develop and Maintain Benefit Package	
Item	**Details**
Result	New or modified benefit package requests are approved, denied, or amended. **Note:** This result is only applicable to optional requests. New/modified benefit packages are defined Updates to Maintain State Plan, Manage Applicant & Member Communication, Manage Provider Communication, Manage Contractor Communication, notifications sent to impacted business partners, trading partners, contractors, and/or clients. Implementation of new or modified benefits.
Shared Data	Benefit plans and associated service tables Provider data Program data Member data Contractor data Operations management data
Constraints	Many benefit plans are defined at the state level where policies and procedures will differ by state.
Failures	Data is not accurate, not available, or a change in State budgetary status that would terminate a new or modified benefit package prior to completion of the process.

Table 31: Business Process for PM – Develop and Maintain Benefit Package

The Develop and Maintain Benefit Package business process *conceptual* flow diagram is illustrated in Figure 45.

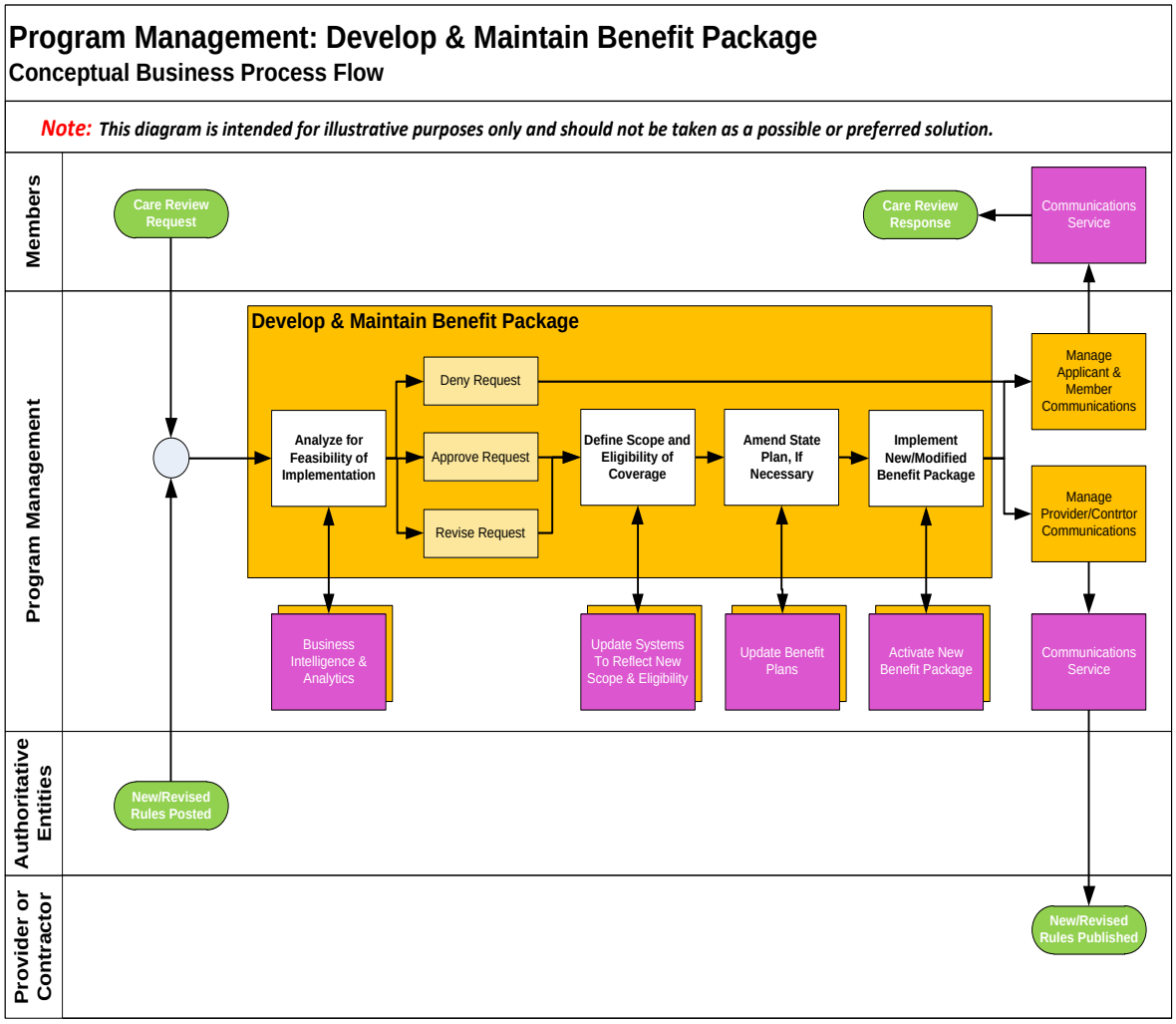


Figure 45: Conceptual Business Process Flow for Develop and Maintain Benefit Package

Benefit Administration – Develop and Maintain Benefit Package Future Information Environment

Information specific to each process and/or service is critical to the success in programs and administered benefits, funding, rebates, procedure-specific requirements, fund balancing, loading fee schedules, training, etc. of the Program Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Benefit plans and associated service tables
- Provider data
- Program data
- Member data
- Contractor data

- Operations management data

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Benefit Administration – Develop and Maintain Benefit Package Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Develop and Maintain Benefit Package service that would meet the expectations of AHS:

- Research with Business Intelligence and Analytics tools
- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Form/letter generation and other communication-related services for communicating results.
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc.
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Develop and Maintain Benefit Package service flow is shown in Figure 46.

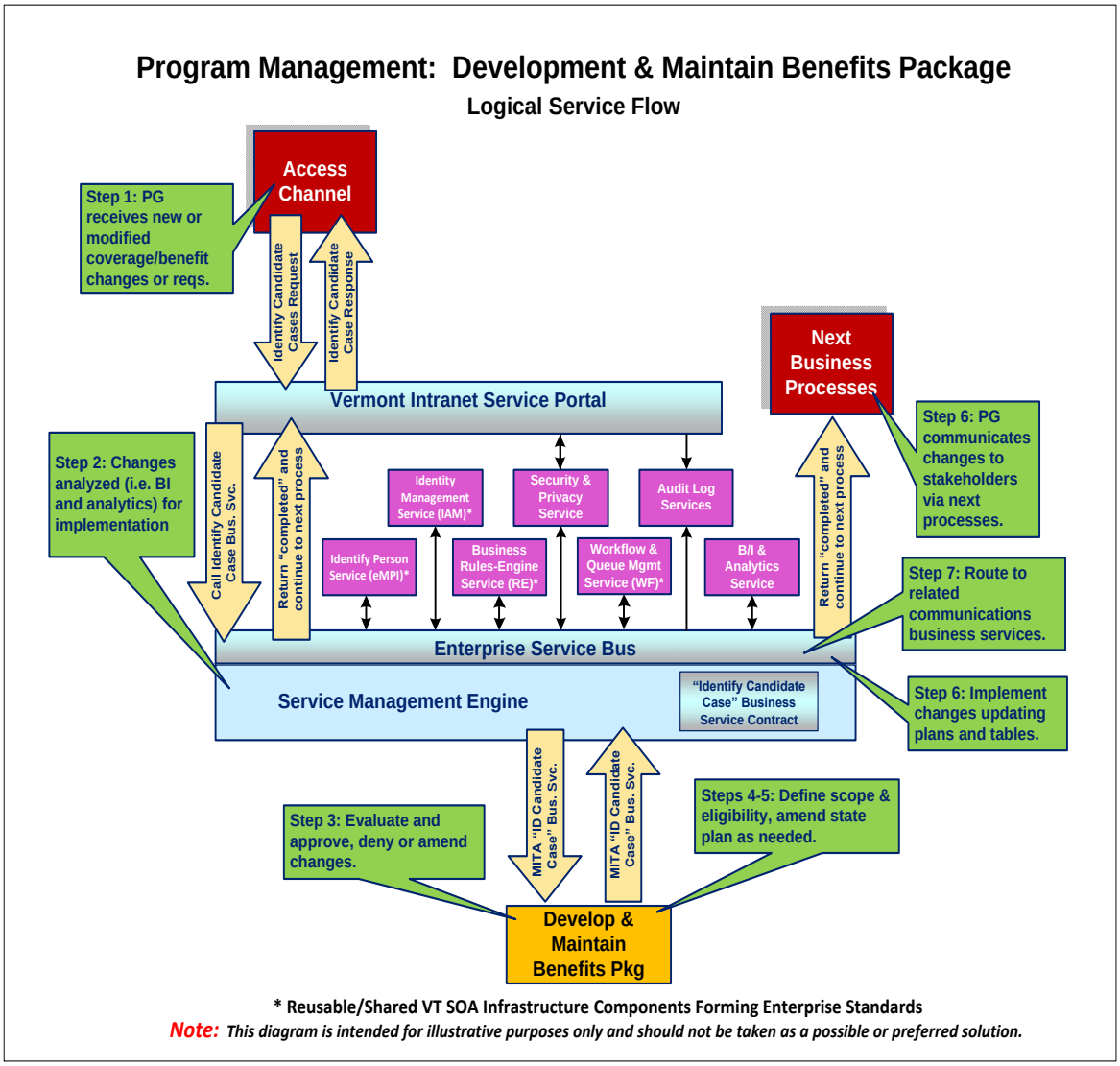


Figure 46: Logical Service Flow for Develop and Maintain Benefit Package

Figure 46 shows the orchestration of the MITA Develop and Maintain Benefit Package business service. This scenario demonstrates the analysis, identification, definition, and creation/modification of benefit packages to be authorized and paid, based on services rendered. The following represent the steps taken:

1. Receipt of coverage requirements and/or recommendations identifying new or modified benefits.
2. Analyze request for feasibility of implementation.
3. Approve, deny, or amend request.
4. Define coverage requirements including: scope of coverage and eligibility criteria
5. Amend State plan, if necessary.

6. Implement new/modified benefit package including system modifications and updating of applicable benefit and service tables.
7. Notify impacted parties via:
    - Manage Applicant & Member Communication, and/or
    - Manage Provider Communication, and/or
    - Manage Contractor Communication; OR
    - Other external communication channels.

Details for the other Program Management business processes are not included in this analysis. These include the following business area/processes:

- ❒ Benefit Administration
    - Designate Approved Service/Drug Formulary
    - Manage Rate Setting
- ❒ Program Administration
    - Develop and Maintain Program Policy
    - Maintain State Plan
    - Develop Agency Goals and Initiatives
- ❒ Budget
    - Manage Federal Financial Participation for MMIS
    - Formulate Budget
    - Manage State Funds
    - Manage F-MAP
- ❒ Accounting
    - Manage 1099s
    - Perform Accounting Functions
- ❒ Program Quality and Management
    - Develop and Manage Performance Measures and Reporting
    - Monitor Performance and Business Activity
- ❒ Program Information
    - Manage Program Information
    - Maintain Benefit/Reference Information
    - Generate Financial and Program Analysis/Report

5.9 Provider Management

The Provider Management (PM) business area focuses on those activities related to all providers, including recruiting potential providers, supporting the needs of the population, maintaining information and credentials on the provider, and communicating with the provider community.

5.9.1 As-Is Analysis

PM As-Is Business Environment

The Provider Management business area is a cross department, AHS administered set of activities for the Medicaid enterprise. DVHA manages the Medicaid provider database for processing claims and assessing the adequacy of geographic coverage of providers. The other departments within AHS that are contracted with DVHA for services must ensure that their providers are accurately enrolled in the DVHA provider database.

Managing providers also includes credentialing of specific types licenses and certifications for providers, such as physicians, nurses, and mental health and social services practitioners. Other providers may be subject to verification of clean driving records, and that they are not identified on various criminal data bases. Credentialing, certifications, and various verifications that are performed for providers require DVHA staff to check numerous databases including, but not limited to licensing and certifications, Child Welfare, Child Protection, Sexual Offender Registries, Motor Vehicle, Medicare databases for provider sanctions.

Currently, the process for capture of provider information is via a paper enrollment and disenrollment form that is available by mail or download from a website. The process currently involves data entry of the provider demographics, licensing, and certification information into a separate database maintained by HP. Performance of the required credentialing and/or licensing, and other verifications occurs before the provider is enrolled with a start date and loaded into the MMIS database is part of this process.

Re-credentialing of providers on an annual basis is also part of this process. These processes can be particularly complicated for DVHA, as the providers annual re-credentialing activities are not staggered, but occur one time annually for all providers by type. Disenrollments of providers are manually processed as received. Changes to mailing addresses, locations and other provider related changes are performed manually.

Typical activities for the Program Management area currently include:

- Processing of hardcopy forms containing demographic information, licensing or certifications, specialty, and other information needed to commence provider enrollment.

- Processing hardcopy forms to perform disenrollment activities.
- Processing credentialing activities that includes capture of needed information and gathering and verification of licensing/certifications, investigation of various other databases, communication with the provider and others.
- Data entry and maintenance of a timely, accurate, date-sensitive, provider database of enrolled provider including current and historical status, eligibility to perform types of services or, specific programs, reimbursement rates, demographics, addresses, provider identifiers, affiliations with group practices, managed care organizations, business sites, billing services, and other entities.
- Processing provider data to support timely and accurate information access for claims processing, service authorizations, decision support, utilization review and quality assurance, TPL, EPSDT, DUR, PERM, EQRO auditing, and other purposes.
- Annual licensing credentialing or certification for providers.
- Routine checks within the various databases for possible incriminating information that may impact on-going enrollment.
- Obtaining and processing information on Medicare sanctions.
- Management and resolution of provider inquiries or communication.
- Generation of communication to providers on policy, program, or other changes.
- Generation of letters, notices, and other communication to providers.
- Standard and ad hoc report generation to capture provider enrollments, disenrollments, types, specialties, geographic distribution, and other reports.
- Development and distribution of educational and other materials for provider.
- Maintaining a provider help line.
- Management of provider grievance and appeal.

PM As-Is Information Environment

A number of systems across the Agency are currently utilized to capture and perform functions based upon the Provider Management groups of data (Figure 47).

For this area, the MMIS is the primary source of this information. This information is then exchanged with ACCESS, SAMS, MedMetrics, and RxClaims to support processing.

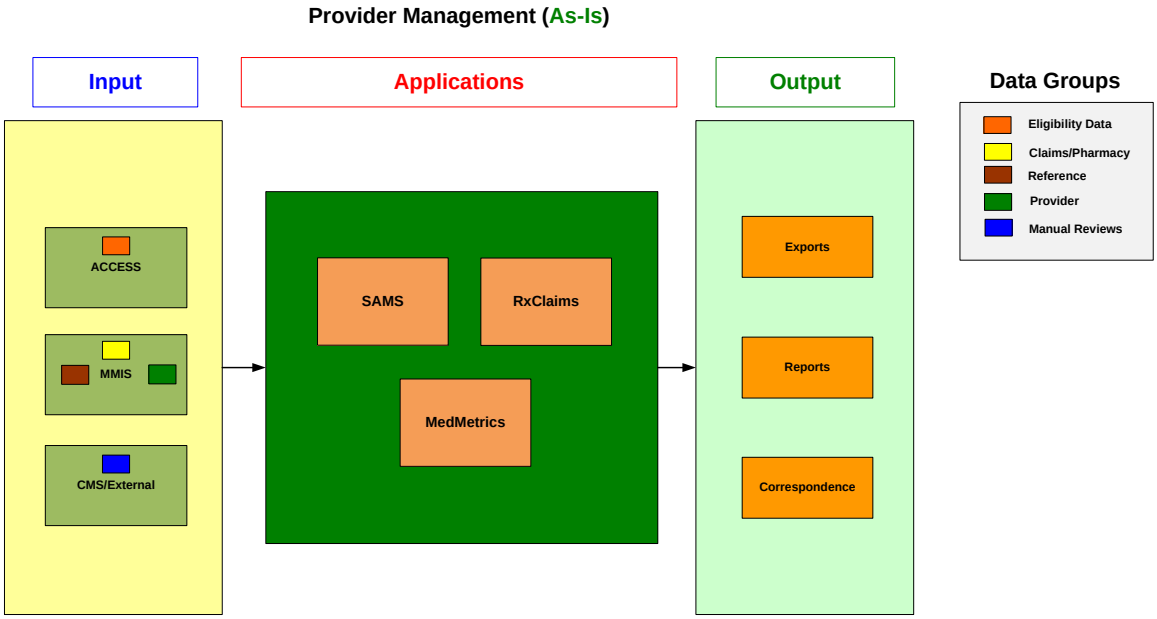


Figure 47: Provider Management (As-Is)

PM As-Is Technical Environment

The Provider Management activities are a mix of manual and automated processes. Currently the process for capture of provider information is via a paper enrollment and disenrollment form that is available by mail or download from a website. The received provider information is verified and then licensing and certification validation is performed. This process often involves accessing various databases maintained across the State to ensure the provider is in good standing; some of the external sources utilized for this verification are the Office of Inspector General (OIG), Child Welfare, Child Protective Services, Motor Vehicle, and Sexual Abuse databases. Ultimately, if the information is deemed correct and the provider is eligible to participate in the Medicaid program, the data is manually entered in the MMIS system.

Re-credentialing of providers is also required on an annual basis. This is particularly complicated for DVHA, as the annual re-credentialing activities are not staggered, but occur one time annually for all providers. Disenrollments are manually processed as received. Changes to mailing addresses, locations, and other provider related changes are performed manually.

Provider Inquiry as a process is fairly automated, as there is access to the website and AVRS.

5.9.2 Evolving Analysis

Provider Management will transition from the current process capability levels (including some manual processes) to the MITA level 3 capabilities outlined below.

PM Evolving Business Environment

Table 32 documents the maturity levels associated with the current and future vision of the sample business processes (Inquire Provider Information and Manage Provider Information) for the Vermont Medicaid enterprise. It identifies the departments that perform the business processes and provides a gap analysis for the business.

Department	MITA Maturity		Gap Analysis
	As-Is	To-Be	
Provider Information Management – Inquire Provider Information			
DVHA	1	3	The current Inquire Provider Information process contains some levels of automation, with information available via the web, AVRS, and electronic interchange. To build upon these capabilities and achieve a maturity level 3, the following functionality needs to be addressed: • NPI is the ID of record used in the inquiry of provider information. • Centralized repository of provider information is accessible to all internal and external stakeholders that have the appropriate levels of security.
Provider Information Management – Manage Provider Information			
DVHA	1	3	The Manage Provider Information process currently sends information to MedMetrics and is available via the web for limited update by providers. To leverage this functionality and achieve a maturity level 3, the following need to be examined: • Centralized repository for storing and maintaining information about all AHS/DVHA providers. • Standardized interfaces and business rules control the modification and subsequent response of data element changes.

Table 32: Provider Management Gap Analysis

PM Evolving Information Environment

The State of Vermont is involved in various initiatives that will standardize, secure, and

extend the information model required to properly address the needs and services of the Medicaid provider community for the Provider Management business area. There will be evolving solutions that may be proposed as interim solutions on the road to MITA capability 3 or above. These will be evaluated by the State for consideration and/or implementation.

PM Evolving Technical Environment

The expectation is that moving to a SOA-based environment will enable the Provider Management area to become more proactive in properly addressing the relationships and services of the many providers critical to the effective delivery of services. These examples of improved communications and governance will be made available by the evolving technical environment being implemented.

5.9.3 Future Analysis

This section describes the future environment and provides *conceptual examples* of process use cases with business flows and logical service flows representing the concepts for the desired future environments for Provider Management. The business sub-areas identified by CMS in the MITA Business Framework for Provider Management (Figure 48) are consolidated into three sub-areas shown as light blue boxes. The seven business processes (depicted as orange boxes) are grouped below under the MITA-aligned sub-areas that best represent their functions. The examples described in this section are denoted by the yellow arrows.

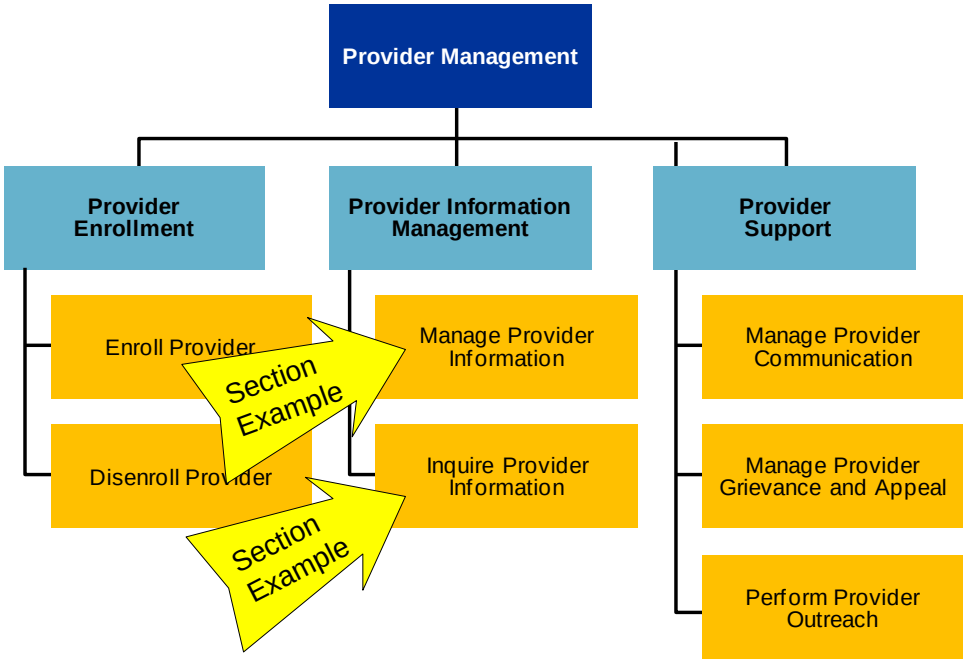


Figure 48: Provider Management Business Framework

To build upon the existing capabilities and achieve a maturity level 3, the following functionality needs to be addressed:

Inquire Provider Information

- NPI is the ID of record used in the inquiry for provider information.
- Centralized repository of provider information is accessible to all internal and external stakeholders that have the appropriate levels of security.

Manage Provider Information

- Centralized repository for storing and maintaining information about all AHS/DVHA providers.
- Standardized interfaces and business rules control the modification and subsequent response of data element changes.

Additional characteristics for Provider Management obtained from the Visioning Sessions are shown in Table 33.

Provider Management	• Automate background and credential checks of providers • Share and exchange provider information data with other systems, as necessary (inter-operability) • Online proactive notification of provider problems from external sources such as CMS • Automated correspondence generation with templates for all provider correspondence (enrollment, disenrollment, outreach)Correspondence generation for outreach and recruitment purposes • Generate letters to beneficiaries when PCP is disenrolled • Ability to initiate mass disenrollments of providers (e.g., group practice change) • Maintain information on PCP's that are accepting new beneficiaries • Associate dates with enrollment information • Provider portals that will allow providers to initiate, inquire, and correspond with the State. Access best practice guidelines • Allow inquiry from external organizations on provider information • Geo-mapping capabilities to identify and track patterns of access of care • Decision support and analytics tools • Expanded Provider Portal to enable online business transactions and communication • Ability to submit and enter claims, view claims status, submit supporting claims documentation and obtain RA through provider portal

Table 33: Provider Management – Features

The Manage Provider Information and Inquire Provider Information future business processes are provided as a conceptual example for achieving a MITA-aligned environment.

Provider Information Management – Manage Provider Information Future Business Environment

The Manage Provider Information business process involves a combination of business and technical web services. It manages all operational aspects of the Provider data store. The Provider data store is the source for provider demographic, business, credentialing, enumeration, performance profiles; payment processing, etc., along with services the provider is contracted to provide, related performance measures, and the reimbursement rates for those services.

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Member Provider Information business process are as follows.

CMS MITA Guidelines: Manage Provider Information	
Item	**Details**
Result	The Provider data store is loaded with new or updated provider information for the purposes of: • Responding to queries from authorized users and applications. • Supplying all Provider Management area business processes with prospective or contracted provider information as needed to detect duplicate applications; schedule recertification, performance, and contract review; perform provider outreach and communication functions, etc. • Supplying all Operations Management area business processes with contracted provider information needed to, e.g., edit claims and encounters, prepare remittance advice/encounter report, and provider EFT/check, etc. • Sending records or pointers to the Manage Program Information business process.
Shared Data	Data needed to record information about the following: Provider demographic; business identifier, contact, and address; credentialing, enumeration, performance profiles; payment processing, tax information, contractual terms, such as the services the provider is contracted to provide, related performance measures, and the reimbursement rates for those services.
Constraints	State specific work flows will determine which processes load and access the Provider data store and by which interactions and messages (e.g., query/response, batch uploads, publish, and subscribe, etc.); and the data content and how they will structure data store records as well as determining how to validate the incoming data prior to updating Provider data store
Failures	Provider data store fails to load or update appropriately; or fails to make data store data available or available in correct format.

Table 34: Business Process for Provider Management – Manage Provider Information

The Manage Provider Information business process *conceptual* flow diagram is illustrated below (Figure 49).

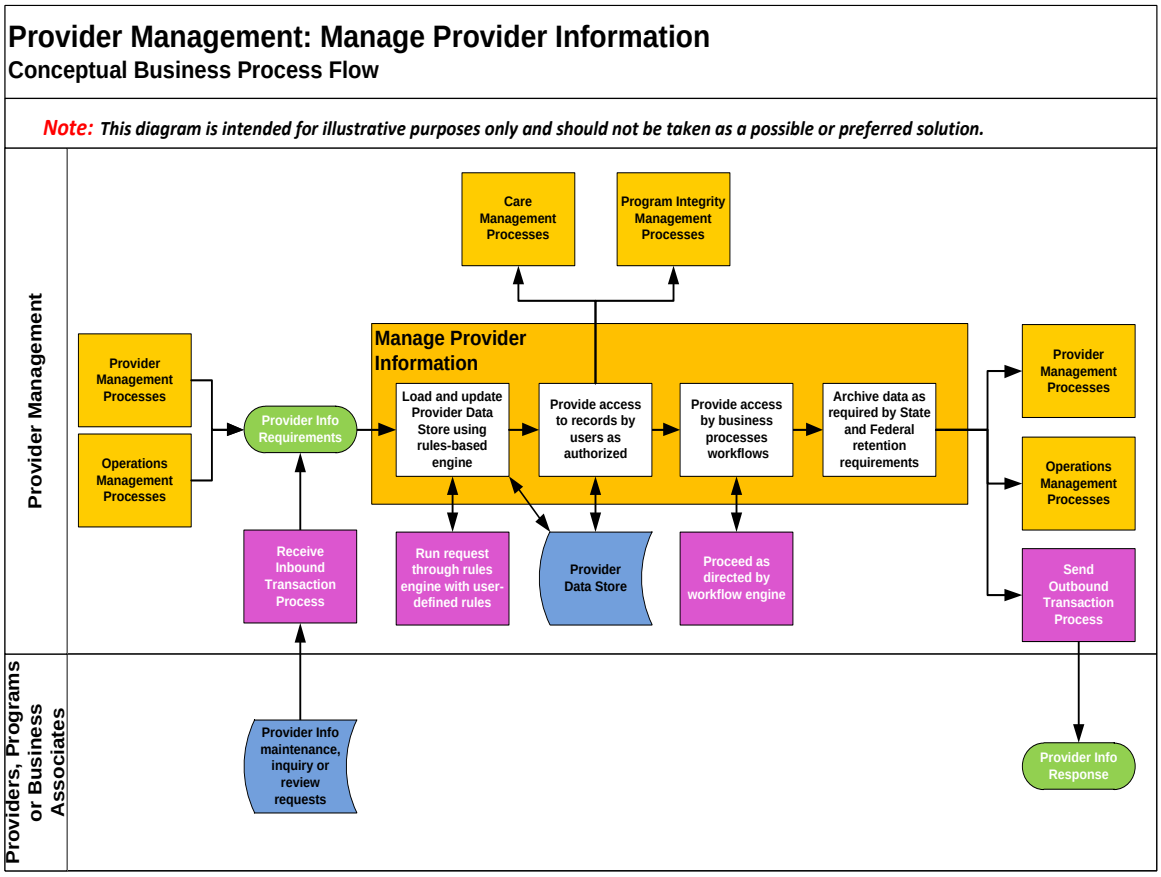


Figure 49: Conceptual Business Process Flow for Manage Provider Information

Provider Information Management – Manage Provider Information Future Information Environment

Information specific to each process and/or service is critical to the successful provider identification, service authorization and eligibility, training and support, payment and reporting, etc. of the Provider Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Provider demographics
- Provider specialties and capabilities
- Provider certification and training
- Provider financial and payment information
- Provider history

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Provider Information Management – Manage Provider Information Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Manage Provider Information service that would meet the State of Vermont expectations.

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Portal Access and Presentation by stakeholders for provider information and authorization requests and status
- Form/letter generation and other communication-related services for communicating results.
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Manage Provider Information service flow is shown in Figure 50.

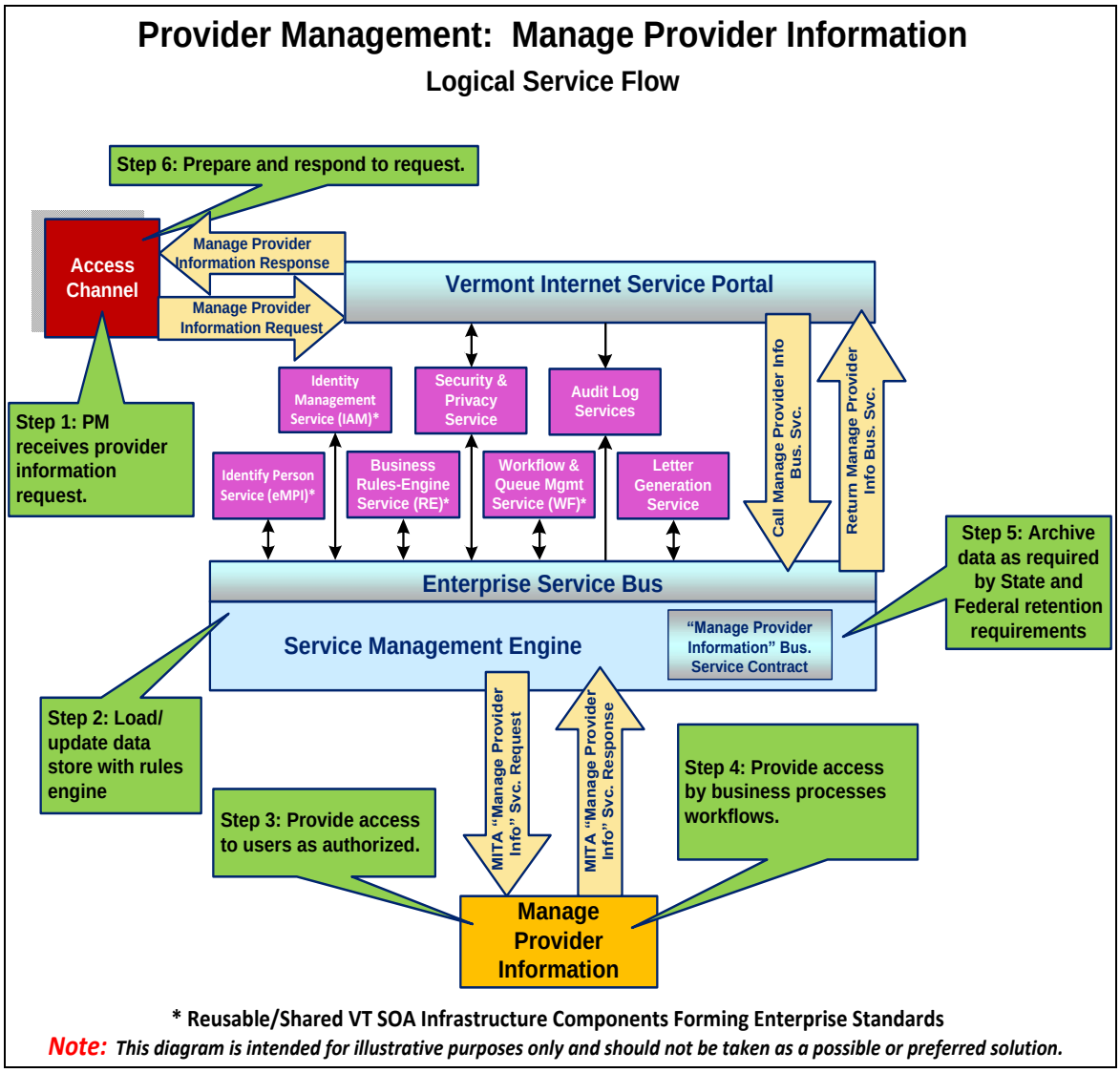


Figure 50: Logical Service Flow for Manage Provider Information

Figure 50 shows the orchestration of the MITA Manage Provider Information business service. This scenario demonstrates the process of stakeholders inquiring about provider information and authorizations, with communication of the results. The following represent the steps taken:

1. Receive provider information, maintenance, inquiry, or review requests.
2. Load and update the provider data store based on established rules in rules-based engine.
3. Provide access to records by authorized users and business associates.
4. Provide access to provider data via other business process workflow engines for processing.

5. Archive provider data as required by state and federal retention requirements.
6. Provide responses or status updates to users as required.

Provider Information Management – Inquire Provider Information Future Business Environment

The Inquire Provider Information business process involves a combination of business and technical web services. It receives requests for provider enrollment verification from authorized providers, programs, or business associates; performs the inquiry; and prepares the response data set for the Send Outbound Transaction process.

A few key general guidelines (result, shared data, constraints, failures) identified by CMS MITA for the Inquire Provider Information business process are shown in Table 35.

CMS MITA Guidelines: Inquire Provider Information	
Item	**Details**
Result	• Provider enrollment verification response data set routed to Send Outbound Transaction process. Data set may include information such as enrollment start/end dates, provider type, and specific specialties. • Tracking information regarding the interchange as needed for the Inquire Provider Information process for measuring performance and business activity monitoring.
Shared Data	Provider data store
Constraints	States determine what information can be shared and who can access requested information.
Failures	• Process unable to process the provider information verification request. • Requester not authorized to receive requested information.

Table 35: Business Process for Provider Management – Inquire Provider Information

The Inquire Provider Information business process *conceptual* flow diagram is shown in Figure 51.

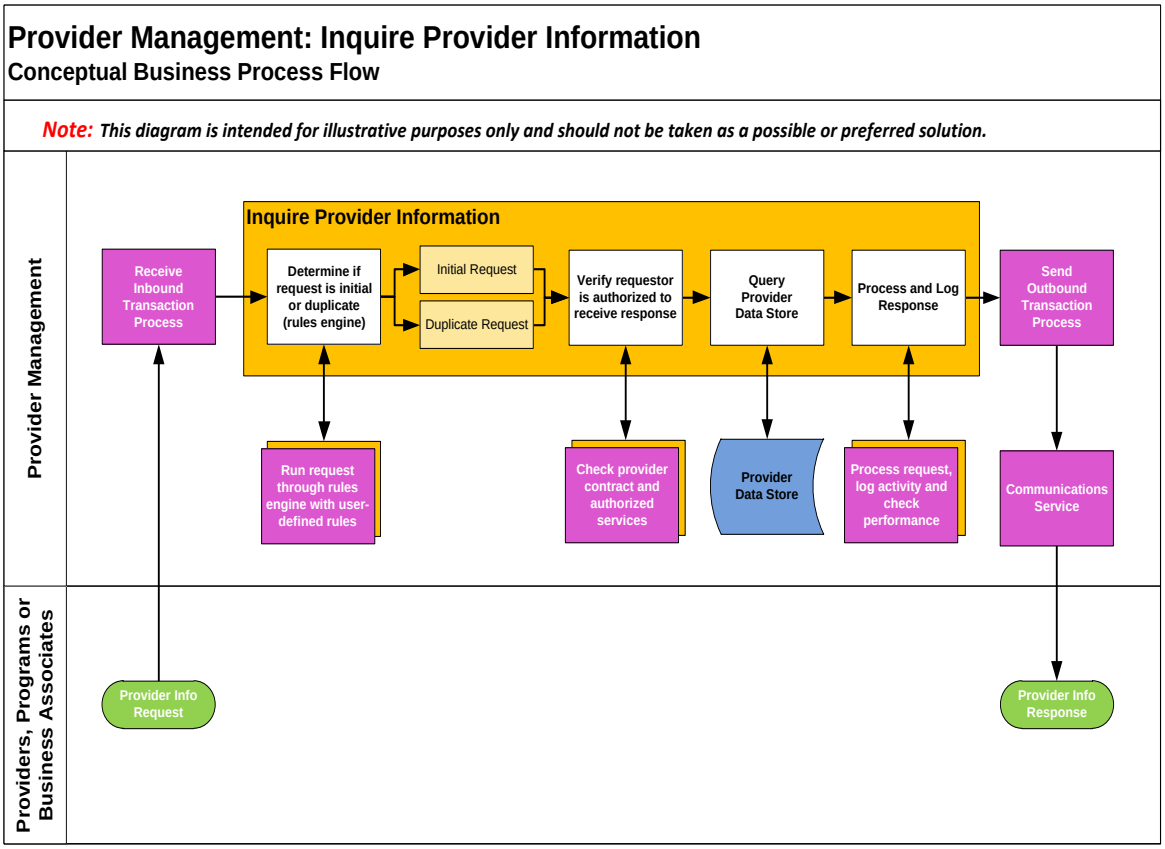


Figure 51: Conceptual Business Process Flow for Inquire Provider Information

Provider Information Management – Inquire Provider Information Future Information Environment

Information specific to each process and/or service is critical to the successful provider identification, service authorization and eligibility, training and support, payment and reporting, etc. of the Provider Management business area. This will involve databases and documents in various formats used across the end-to-end processes. For this business process, it is anticipated that the following data sets, among possibly others, will be important:

- Provider demographics
- Provider specialties and capabilities
- Provider certification and training
- Provider financial and payment information
- Provider history

This information should follow health care standard data schemas and be compatible with transactions being passed between health care entities.

Provider Information Management – Inquire Provider Information Future Technical Environment

The following technical capabilities could be incorporated into the solution set for a MITA/SOA aligned Inquire Provider Information service that would meet the State of Vermont expectations:

- Automated administration of user defined rules
- Business rules engine to apply rules in appropriate plan approvals to authorized service requests or exception processing
- Workflow through business and web services required, with assignment and queue management
- Portal Access and Presentation by stakeholders for provider information and authorization requests, and status
- Form/letter generation and other communication-related services for communicating results.
- Database Management System to inquire, store and update any rules, metadata, benefit plans, providers, members, etc. data
- Single Sign-On by State resources for integrated access to authorization and approval services
- SOA-related web services (such as logging) and other SOA components

An example of a graphical representation of this solution set for the Inquire Provider Information service flow is shown below (Figure 52).

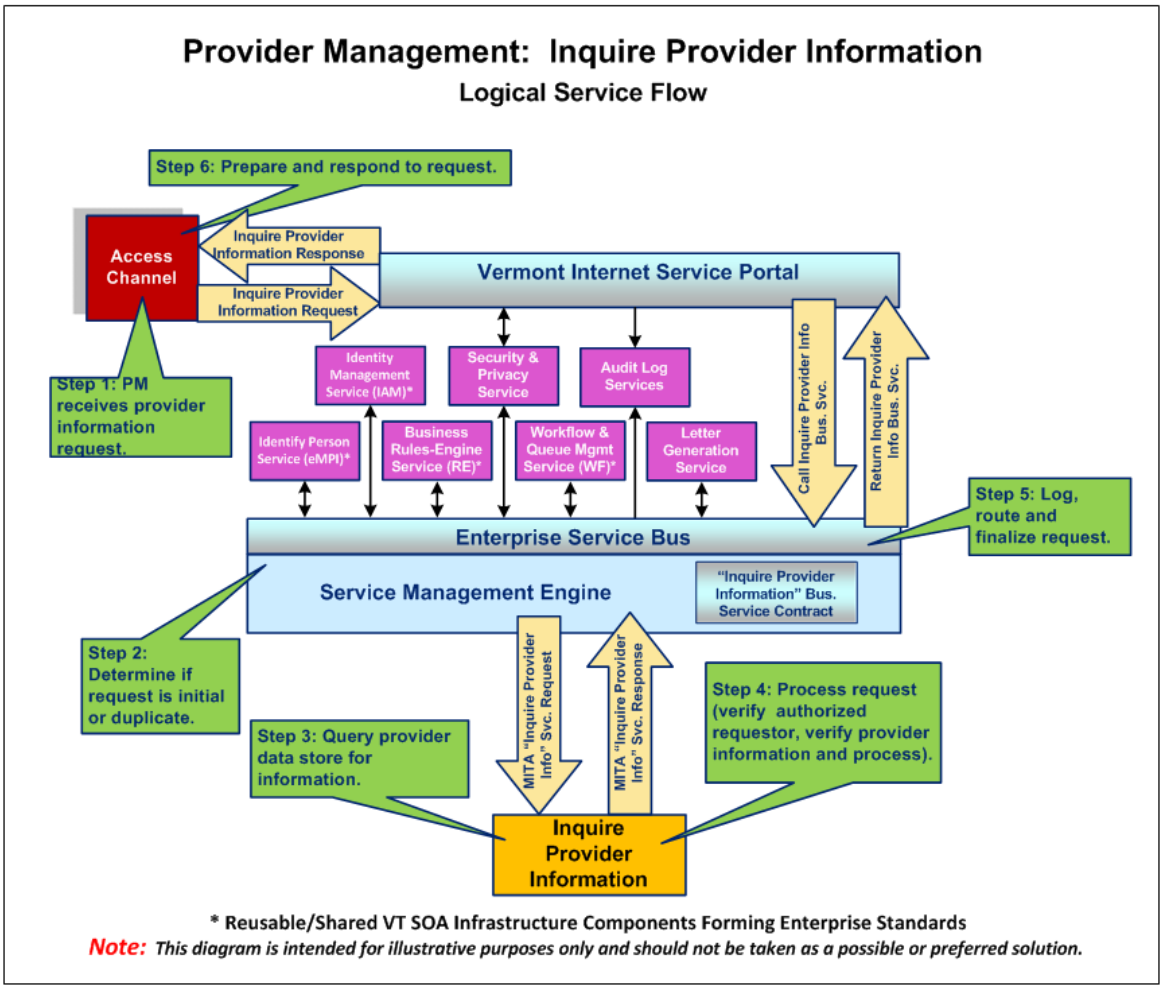


Figure 52: Logical Service Flow for Inquire Provider Information

Figure 52 shows the orchestration of the MITA Inquire Provider Information business service. This scenario demonstrates the process of stakeholder inquiries about provider information and authorizations, with communication of the results. The following represent the steps taken:

1. Receive provider verification information data set from Receive Inbound Transaction Process.
2. Determine request status as initial or duplicate.

   Note: May not be a common practice to check if one inquiry is already in process by submitter.
3. Query Provider data store for requested information.
4. Process response.

5. Log response.
6. Prepare response data set for the Send Outbound Transaction process.

Details for the other Provider Management business processes are not included in this analysis. These include the following business area/processes:

- Provider Enrollment
  - Enroll Provider
  - Disenroll Provider
- Provider Support
  - Manage Provider Communication
  - Manage Provider Grievance and Appeal
  - Perform Provider Outreach

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Section 6 – Information Architecture Analysis

The Information Architecture (IA) is the compilation of the business requirements of the enterprise, the information, process entities, and integration that drive the business and rules for selecting, building, and maintaining information. In short, the objective of the Information Architecture is to manage the information of the enterprise. This section focuses on the high-level concepts presented by MITA as well as the current, evolving, and future IA environments of the Agency.

6.1 Overview

The Information Architecture aligns the business processes to the technology (information systems) supporting these processes, promotes information sharing, and facilitates cross-agency information exchanges. Essentially, IA provides an organization with a high-level model of its critical information. This depiction of critical information allows an organization to improve overall efficiencies by:

- Aligning information requirements with the Enterprise's business and operational vision and direction;
- Enabling interoperability of systems and data sharing; and
- Promoting organizational effectiveness across divisions and agencies for data collaboration through governance policies and procedures.

The MITA Information Architecture serves as a conceptual foundation for the Agency's IA framework. The sections below expand upon the MITA components and introduce a set of data groups defined to capture representative categories and classifications of data.

6.2 As-Is Architecture Analysis

As illustrated in Section 5 – Business Architecture Analysis, the Agency's current Information Architecture is classified by a set of data groups. These data groups provide a way to categorize data for the purposes of analysis and alignment to business processes. These groups are a decomposition of the high-level data shared-data elements provided in the MITA Framework. It is expected that the data groups presented in the following table will be refined and enhanced as solutions and standards are implemented during the course of upcoming system procurements.

Category	Data Grouping
Business Relationship Management	• Entity Demographics • Legal Agreements • Data Standards • Communications • Reporting

Category	Data Grouping
	• Customer Services
Care Management	• Claims • Eligibility • Demographics • Authorizations • Assessments • Clinical Guidelines • Registries • Vital Statistics • Census • Internal and External Data Exchanging • System Access
Contractor Management	• Contractor Demographics • Policies and Procedures • Contractor Outreach • Project Initiatives • Grievance and Appeal
Member Management (ME)	• Data Validation • Enrollment • Communications & Tracking • Call Center Logs • Member Data • Coordination-of-Benefits
Operations Management	• Provider Operations • Referrals • Eligibility • Provider • Communications • Claims Edit • Audit Rules • TPL • Business Edits • Contracts • Pricing • Reference • Member • Financials • Provider Data • Data Management • Data Communications • Operations Management • Fraud and Abuse External databases
Program Management	• Rate setting • Data Maintenance

Category	Data Grouping
	• Decision Support • Accounting • EQRO and other Survey results
Program Integrity	• Case Management
Provider Management	• Licensure • Call Logs • Operations • GeoAccess Analysis • Provider Disenrollment Reports

Table 36: Agency-defined List of Data Groups

Business and application data change constantly. Integration of systems across business processes is a good mechanism to help ensure that data is updated in a uniform manner. However, AHS and its departments currently use of a wide variety of systems and rely on extensive manual processes to conduct business. This is illustrated with the graphical depictions of the as-is Information Architecture by MITA business area in Section 5 – Business Architecture Analysis. An analysis of AHS' ability for data to be updated across the Agency found the following:

- Many of the health care functions conducted by the various departments are managed manually, predominantly through the use of Microsoft Excel- and Access-based systems – in order for these systems to remain up-to-date, manual intervention is constantly required, putting these systems at risk if personnel or data access changes.
- Updating systems from the official data source is generally a manual function – most desktop applications are updated based on a paper report or spreadsheet file that must be applied manually.
- The large automated systems seem to meet the data updatability measure reasonably well – the main automated systems have numerous interfaces that have been proven over time. However, some key systems such as SAMS do not have extensive automated interfaces with the other major systems.
- Similar systems in various departments have asymmetric data updatability standards, meaning there is not a set of procedures in place to ensure data is updated correctly. This could lead to differing results in the same sets of data.

Because so many of the business processes are supported by manual systems, it is very difficult to determine the quality of the data being used. Standardization of data updates will help ensure that the data being used is correct, and improve staff performance. In addition, moving manual processes into automated systems will also help in this area. Specifying interfaces from the systems of record will also help manage the risk of inconsistent and inaccurate data. These important factors are an underlying theme of the current AHS system procurements.

The complexity and stovepipe nature of the current implementation of the Agency's applications have resulted in a lack of interoperability. This problem will grow exponentially as the Agency begins to make use of electronic health records and share data among enterprises and other groups as part of normal business processes. Guidance is needed by the states and vendors to aid in this transition, and the MITA Data Management Strategy (DMS) is designed to provide that guidance.

Another critical aspect of the current IA environment is the Agency's existing data warehouse, the AHS Central Source for Measurement and Evaluation data. CSME currently collects information from a number of the Agency's systems, such as the MMIS and the AHS eligibility system, ACCESS. Currently, the transform and load processes provide a view of an individual and that person's interactions with the different departments of the Agency. Additional information about CSME is provided in the Technical Architecture Analysis section (Section 7).

6.3 Evolving Architecture Analysis

The Agency currently has a number of activities underway to continue its evolution towards a more client-centric focus. For example, the Agency is currently undergoing an effort to redesign specific business processes, such as Children's Integrated Services. This initiative is an aspect of the legislature's Challenges for Change initiative. From an IA perspective, the first step in this evolution is to implement the Agency's core Enterprise Architecture. This effort will provide a foundation to support future SOA efforts and a more comprehensive IA. This foundation will be supplemented by the procurement of the MES. The IA aspects of MES will be based upon the basic tenets put forth in the MITA Framework.

In addition to the procurement of these SOA components, the Agency has been examining and analyzing different data and metadata standards found in the industry. For example, the Agency has begun an analysis of the Office of Child Support Enforcement (OCSE) standard, which is a subset of the National Information Exchange Model standards. This standard contains core elements and definitions as they relate to data classifications, such as person, case, financial, etc. Furthermore, the Agency has discussed the standards put forth by the Health Information Technology Standards Panel (HITSP), as reflected in Table 37.

Element	Component	Module	Data Element	Value Set	Template
ASC X12	Transaction or Transaction Set	Table, Loop, Segment, or Composite Data Element	Simple Data Element	Internal and External Code Sets	Implementation Guides, or a type 3 Technical Report.
DICOM	Service Object Pair	Information Entity	Attribute	Context ID	Information Object Definition

Element	Component	Module	Data Element	Value Set	Template
HL7 Version 2	Message	Segment or Field	Field or Component	Table	Conformance Profile
HL7 Version 3 including CDA	Message or Document	RIM Class, Model, R-MIM, HMD, or C-MET	RIM Attribute	Concept Domain, Code System, or Value Set	Template
NCPDP Formulary & Benefit	Message	Record	Field	External Code List (ECL)	Implementation Guide
NCPDP SCRIPT	Transaction	Segment	Field	External Code List	Implementation Guide
NCPDP Telecommuni-cations	Transmission	Segment	Field	External Code List	Implementation Guide
OASIS ebXML	Message	Class	(ebRIM) Attribute	Classification Scheme	Not Available
OASIS EDXL	Message	Container	Element	enumeration	Not Available

Table 37: Information Architecture Standards

The continued evolution and definition of the Agency's data standards and management plan, along with the transition to SOA, form the foundation of the Agency's future enterprise. This foundation will be further supplemented with the procurement of the MES and VIEWS systems. The standards referenced here are not intended to be a comprehensive list; instead, this information is presented to provide examples of the concepts and methodology the Agency is looking to adopt in the future.

6.4 Future Architecture Analysis

The future vision of the Agency is to adopt and enhance the MITA Framework through the procurement of the MES. The sections below outline the basic tenets of the MITA IA as well as provide specific examples of the alignment of these components to the future vision of the Agency.

The MITA IA provides a conceptual and logical view of all of data commonly used throughout a Medicaid enterprise. It describes the integrated information requirements of state Medicaid enterprises using general data objects and relationships. It is the primary tool for strategic planning, communicating information requirements throughout the organization, implementing integrated systems, and providing an integrated information strategy.

The Medicaid enterprise data model layer is the pivotal layer of the IA, as it connects reusable business concepts to application-level views of enterprise data through generalized content. It is being built incrementally through the conceptual and logical

design of individual processes and services. The MITA IA helps to ensure that technology decisions align with Medicaid business needs and achieve business goals.

AHS' enterprise will evolve to optimize adaptability, flexibility, interoperability, and data sharing. This evolution will enable major improvements in policy and decision making, as well as day-to-day operations and client satisfaction.

The MITA Information Architecture consists of four components:

- Data Management Strategy
- Conceptual Data Model
- Logical Data Model
- Data Standards

The analysis of the Agency's existing enterprise within these constructs led to the refinement of these classifications as well as the development of the data groups.

6.4.1 Data Management Strategy

The Data Management Strategy provides a structure that facilitates the development of data that can be effectively shared across the Agency's health care enterprise boundaries to improve performance. It also provides an impetus for AHS to better understand its data and how it fits in the realm of Medicaid information. The DMS addresses fundamental areas necessary to enable information sharing opportunities and to position AHS to operate in an environment of global information.

The MITA DMS provides AHS with a strategy for combining tools, procedures, and processes to handle future Medicaid enterprise data needs. The MITA DMS will provide the following benefits:

- Align the State's information-related activities and provide a roadmap to use in planning;
- Provide guidance for making decisions associated with information, data sharing, and seamless interoperability;
- Reduce cost by aligning and focusing information-related activities;
- Provide an information structure that enables Medicaid enterprises to share data in formats with a common definition resulting in consistent application across the enterprise;
- Reduce risk to system development by reducing custom solutions and promoting interoperability and data sharing;
- Provide a common set of processes, tools, and solutions for the information needs of Medicaid; and
- Allow individual states to benefit from the information assets of other states.

The MITA DMS provides mechanisms to monitor and influence the environment in which AHS operates with respect to both the data landscape and the enabling technologies. Data landscape refers to the broad range of national initiatives, standards bodies, and other organizations engaged in defining or influencing standards such as the Health Insurance Portability and Accountability Act, and the National Medicaid Electronic Data Interchange Healthcare Workgroup (NEMH). The term "enabling technologies" refers to open standards, protocols, middleware, and other mature or emerging technologies that facilitate data sharing.

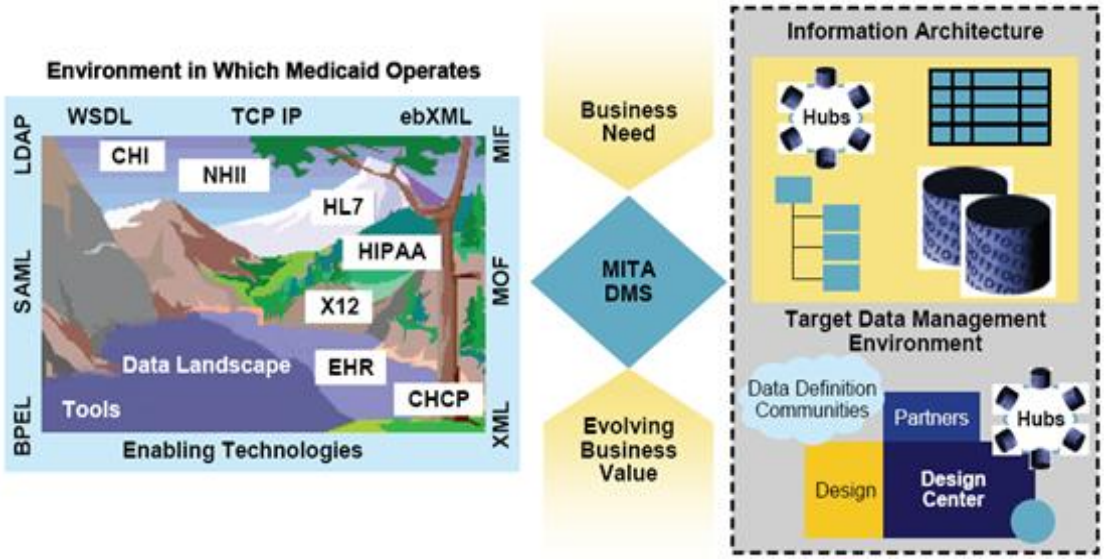


Figure 53: MITA Data Management Approach

The MITA DMS defines an enterprise wide data strategy (Figure 53) that addresses the business flow of data across the AHS health care enterprise. It involves architecture, modeling, standards, metadata, management, interoperability, security and privacy, access methods, quality, and performance measurement. The three key parts of the MITA DMS are as follows:

- **Data Governance** – Defines the governance process for making enterprise-wide decisions regarding the Agency's information holdings. This provides the capability to determine/assign ownership, determine data standard adoption processes, address data integrity, and define process for business-process development.
- **Data Architecture** – Establishes standard data-management procedures for the Agency's data models. Specific guidelines will be developed regarding data documentation, data-sharing development and use applicable to both structured and unstructured data, and the management of metadata of all types. This data architecture assigns accountability for data at the MITA business levels.
- **Data Sharing Architecture** – Describes technology considerations for the health care enterprise to participate in information-sharing communities. One goal is to have a centralized dictionary and directory that will store and maintain this

information for general use. The data-sharing architecture also addresses the conceptual and logical mechanisms used for data sharing (i.e. data hubs, repositories, and registries). The data sharing architecture will also address data semantics, data harmonization strategies, shared-data ownership, security and privacy implications of shared data, and the quality of shared data.

With these standards and guidance in place, we can envision a typical use case of SOA-based data and business process exchange taking place in a future state by means of automation. These processes exist today, but rely on fragmented and manual processes that can result in error-prone operations. One can envision a typical workflow process dependent on automation that can efficiently and accurately accomplish the activities shown below (Figure 54).

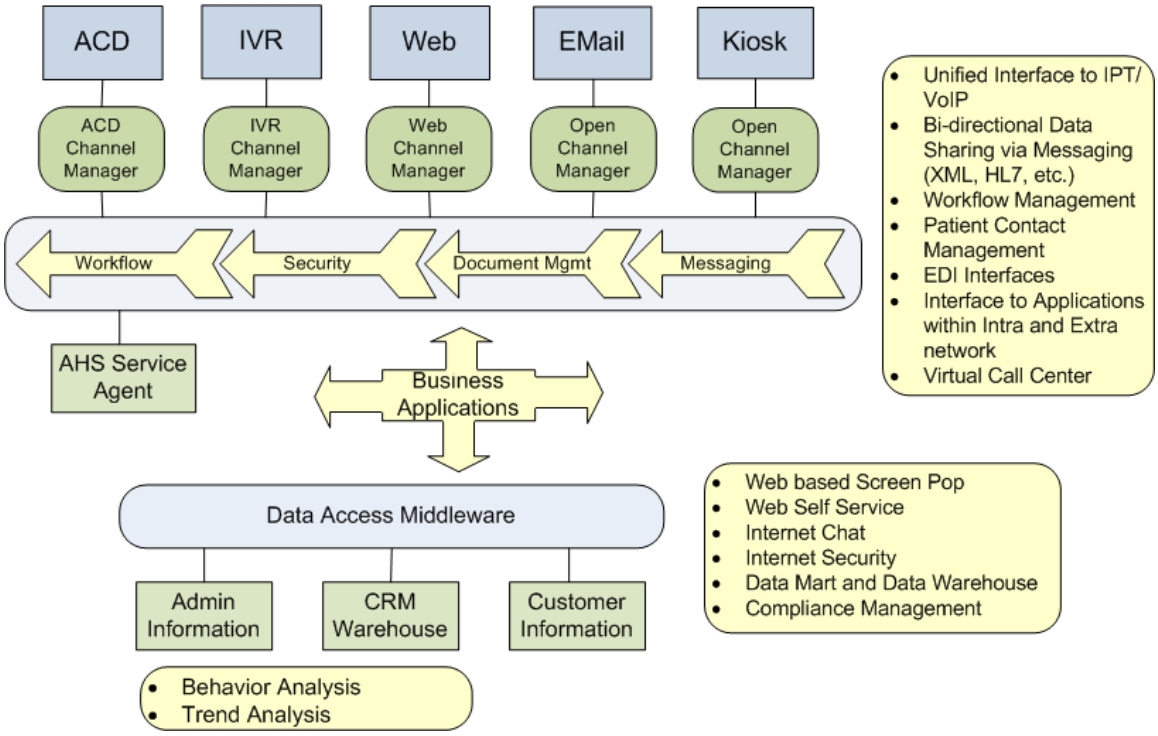


Figure 54: ESB and Workflow Process

This automated process is one of many ESB and workflow operations that could be seamlessly integrated throughout the Agency's enterprise. In addition, it could be extended to outside agencies via a standards-based messaging system only available with the SOA/ESB platform.

While MITA provides guidance and direction for data management, most Medicaid programs are at the early stages of adoption and implementation of these principles. Hence, it is both a critical and opportune time for AHS to deploy a comprehensive DMS, to coincide with the implementation of the MES system. This will allow the State to benefit from consolidated data shared across departments, external partners, and diverse technology platforms.

6.4.2 Conceptual Data Model

The Conceptual Data Model (CDM) shows the MITA subject areas that are common to the states and the relationships between these common subject areas. A CDM represents the overall logical structure of the data, which is independent of any software or data storage structure, and provides a formal representation of the data needed to run the Medicaid enterprise or business process. It may contain data objects not yet implemented (e.g., to-be objects and relationships). The CDM contains the principal entities and relationships required by the Medicaid enterprise. It is used primarily as a communication tool between the business user and IT architect to obtain agreement on the scope and relationships of the data and to facilitate the identification of subject areas.

The CDM provides a mechanism to bridge the gap between Medicaid subject matter experts and IT architects and designers. The model depicts the major business information objects (subjects/entities) in their relationships to each other using business terminology. In addition, the MITA CDM provides the basis for an IT staff (e.g., MITA, states, or vendors) to develop a Logical Data Model (LDM). The CDM also provides an initial mechanism for ensuring the completeness of the business model and serves as a tool that enables the reengineering of Medicaid business processes. It is only through the use of a shared data model that the states will achieve true plug-and-play capabilities of services and interoperability.

The CDM identifies subject areas and groupings of data important to the business and defines their general relationships. Examples of these groupings for MITA are member, provider, address, and claim. These groupings in data modeling terminology are referred to as entities. The CDM also depicts the relationship between entities. For example, a member has an address (see Figure 55). The model also shows whether this relationship is mandatory or optional, and whether it is a one-to-one, one-to-many, or many-to-many. The CDM will also reference any associated data standards.

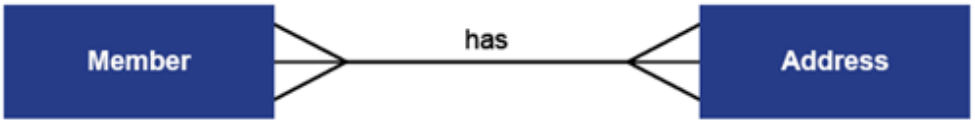


Figure 55: Conceptual Data Model Example

With the adoption of CDM, business processes and systems will be aligned to support logical data flow, and will provide the foundation for:

- Developing a “Blue Print” for Data Access Layer (DAL) plans
- Normalizing data (3NF – 3rd normalized form) – Allows for Data to be available to “authorized” entities (Contact Centre, Hospitals, Medical Records Management, Claims Divisions, etc.)
- Integrating with Larger Holistic Automated Enterprise Systems (Defining SOA to-be)
- Integration of Legacy Systems and 3-tier (existing) as well as to-be platforms

The CDM for the Agency will be largely developed through the current procurement processes. As solutions are selected and designed, the CDM necessary to support the business of AHS will be refined and implemented. It's important to note that this CDM will also need to accommodate the future vision of MITA, which includes utilizing HL7's Reference Information Model. This allows AHS to utilize standard health care information models to support interoperability.

6.4.3 Logical Data Model

The Logical Data Model shows data subject areas broken down into the data classes and attributes needed for every drilled-down business process, as well as the relationships between these subject areas. The LDM identifies all of the data elements that are in motion in the system or shared within the enterprise.

A data model is a preliminary representation of something that serves as the plan from which the final object is to be constructed. Data models serve as a blueprint or plan for building information systems, and they serve as a tool that enables the reengineering of business processes and enterprise strategies. The goal of this initial blueprint is to document the data (and the characteristics of that data) necessary to support the Agency's health care enterprise. Specifically, the MITA data models will be used by system architects and designers to develop plug-and-play and interoperable Medicaid information services.

The MITA LDM provides guidance and specifics to an IT staff (e.g., states or vendors) on how to design MITA enterprise service interfaces. It is also used to develop the State's physical data model (PDM), which describes how data will be distributed to different processing nodes and how data will be structured to meet performance objectives in a specific physical implementation. The LDM provides a mechanism for ensuring the completeness of the business model and serves as a tool that enables the reengineering of Medicaid business processes. It is only through the use of a shared data model that the states will achieve true plug-and-play capabilities of services and interoperability.

The MITA LDM will provide the following:

- Focus on what data comprises the organization, and not on what data is needed by the processes
- Facilitate business-focused data analysis
- Aid in understanding enterprise wide business rules and business data usage, as well as uncovering existing data defects, from a 360-degree view of a business
- Provide a basis for performing data integration
- Contribute to improved data quality

An LDM presents a detailed version of the CDM. A simple example of a LDM is presented in Figure 56.

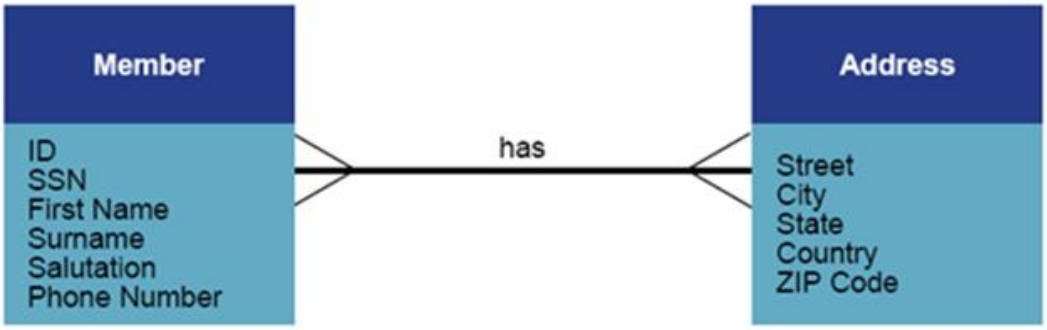


Figure 56: Logical Data Model Example

The member entity has additional details specified (e.g., ID, SSN, first name, etc.). In data modeling, these additional details about a member are referred to as attributes. Attributes can be specified as mandatory or optional. In addition, an attribute can be used to locate a particular entity in the system. Typically, a member's data is located by using either the ID or SSN, in which case both of these attributes would be labeled as key attributes.

The LDM will also reference any associated data standards. Data organization rules are also applied to the data model in order to do the following:

- Minimize duplication
- Ensure precise capture of business logic
- Prevent loss of information
- Aid in model management

The data modeling term used for the application of these rules is normalization. The objective of an LDM is to have a fully attributed and normalized data model. The parts of the MITA LDM are as follows:

- **Entities** – An entity represents a person, place, object, organization, event, concept, or function that represents an information store of particular interest to the State and/or CMS. In general, an entity must have one or more attributes that distinguish it from other entities (i.e., key attributes), and it must have at least one relationship to another entity.
- **Attributes** – An attribute is an item of data, a fact, or a single piece of information about an entity (e.g., the attribute beneficiary birth date provides information about the beneficiary entity).
- **Relationships** – Relationships depict the business rules/requirements by which two entities are joined. The interaction between the entities joined by the relationship can be traced in either direction.
- **Definitions** – Definitions must be clear, precise, and unambiguous. They must identify and distinguish the item being defined from any other actual or possible item.

- **Domains** – The domain to be applied to the entity or attribute must be specified.
- **Related Standards** – Any standards related to the entity or attribute must be defined.
- **Entity-Relationship (E/R) Diagram** – E/R diagramming is the method by which a formal, graphical depiction of the model is produced.

6.4.4 Data Standards

The lack of shared data standards is one of the most important issues currently facing Medicaid system and subsystem interoperability. This issue goes well beyond the Medicaid enterprise to include the private sector and other government agencies. It adversely affects current Medicaid systems in many ways:

- Creates the need for translators
- Constrains automated processes
- Reduces the potential of business processes that use shared data
- Requires data to be duplicated, which results in poor quality and wasted physical storage
- Increases paperwork and data collection burdens
- Reduces the analytic potential of health data
- Reduces the capability for data sharing, which in turn limits the usefulness of data used internally or externally (e.g., with trading partners, other state Medicaid enterprises, other agencies, etc.)

To resolve these issues, MITA has developed the Data Standards (DS). The DS identifies the applicable standard for each MITA data element, which defines the standards applicable to the administration and operation of the Medicaid enterprise's data. Each standard is defined by the following attributes:

- Title
- Category
- Objective
- Source (i.e., standards body)
- Type
- Versions and status
- Applicability
- References
- Relationships to other standards
- Key terms

These standards are identified in associated standards templates (Table 38) and will relate to the key design aspects and concepts that are defined in the MITA Framework. The table illustrates the relationships between the data standards, CDM, LDM, and PDM.

Data Standard	Conceptual Data Model Grouping	Logical Data Model	Physical Data Model
Title	Name, SSN, DOB	Entity	Table
Type	Address	Attribute	Column
Category	Status	Entity	Table
Relationship	Source	Primary Key	Primary Key Constraints
References	Status (Veteran, Citizenship, Death, etc.)	Rule	Check Constraint, Default Value
N/A	N/A	Definition	Comment
N/A	N/A	Alternate Key	Unique Index

Table 38: Data Standards, CDM Grouping, LDM, and PDM

The technical implementation of the DS can be done by implementing Business Object Documents (BODs). These BODs are standardized business messages that carry data between different business components and request work on that data. Standard business messaging ensures an application understands the context of the data it receives.

An example of a BOD is "GetClaim". This BOD has both the request and the data structure to hold a claim report. Developers would retrieve this BOD in their application code (any open platform) from a queue and define it as an object to extract Medicaid Claim information and process instructions to act on that information.

A list of BODs is necessary to build the Agency's enterprise data model. This will lead to a 3NF model to allow enterprise level data exchange.

Concepts of Data Standards

Data standards are necessary when information is exchanged between two or more parties. They enable the sharing or exchange of information in a way that guarantees the mutual understanding of what is represented within that information. Data standards can be used for automated or manual processes. The key elements of a data standard are data element names, definitions, data types, and formatting rules. Data standards fall into two major categories:

- **Structure** – Structure data standards specify how data should be formatted or structured. Structure data standards are used for messages and data stores (e.g., flat files and databases) and enable two computer applications to exchange data, though not necessary to understand or act on that data. Traditional data standards have focused on the structural aspect of data standards (e.g., electronic data interchange [EDI], Health Level 7 [HL7] Version 2). This approach has allowed the systems or

applications to exchange data, but required point-to-point agreements (e.g., an interface control document) to enable applications to actually use this data.

- **Vocabulary** – Vocabulary data standards conversely, deal with the content of the data elements (i.e., the semantics of the data). Vocabulary data standards enable systems to understand the meaning of the data. International Classification of Diseases, Ninth Edition, Clinical Modification (ICD-9-CM) is an example of a vocabulary data standard.

Benefits of data standardization include, but are not limited to, the following:

- Interoperability and the means by which a Medicaid enterprise can seamlessly share information, which will improve data availability to external users (e.g., public health and bioterrorism detection)
- Improved data quality and consistency
- Reduced medical errors, improved care quality, and the elimination of redundant cost through the use of standardized terminologies
- Increased data compatibility
- Improved consistency and efficiency of data collection, with a seamless flow of information without the need for reformatting and transcribing data each time it needs to be shared
- Reduced data redundancy (i.e., data only needs to be stored once in the enterprise or even not at all, as in the case of business processes that use data from an external enterprise)
- Improved data access
- More efficient use of resources by enabling states to reduce the effort needed to remain current with the ever-expanding world of data standards and return to the business of Medicaid

Business Scenarios Showing the Use of Standards

There are numerous scenarios for how various standards might control the way health care information is exchanged. Examples are show in the diagram below (Figure 57). Note that each number in the diagram corresponds to one of the following scenarios:

- Person-to-Computer Exchange
- Computer-to-Computer Exchange
- Person-to-Multiple Computers Exchange
- Computer-to-Person Exchange
- Person-to-Person Exchange
- Information Exchange Standards

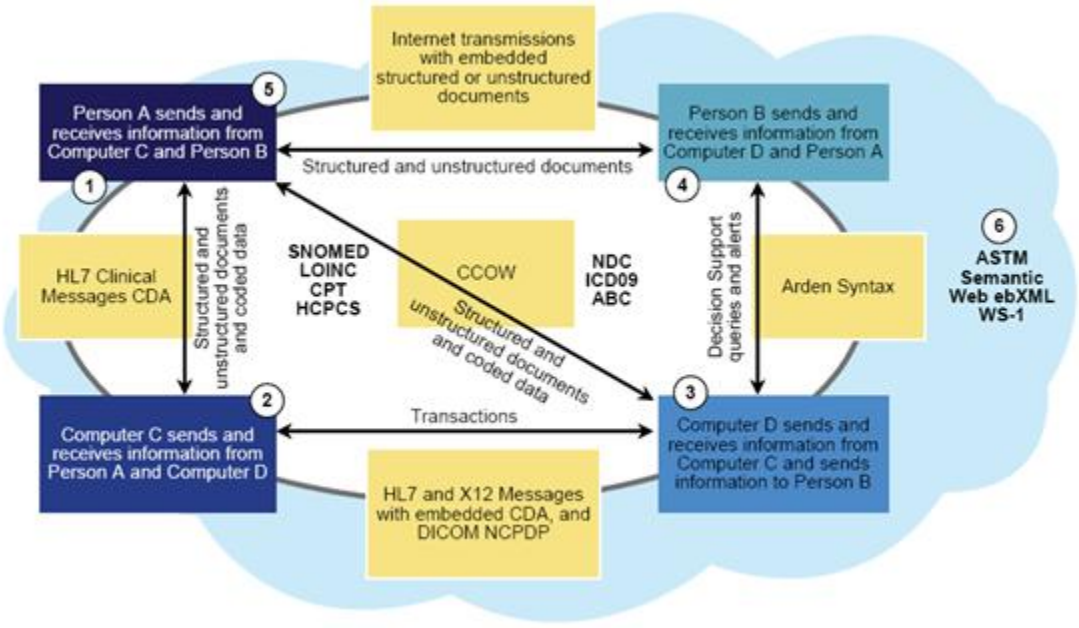


Figure 57: Data Standards

Model-Based Standards

To ensure interoperability of their artifacts, many information standards organizations derive their emerging health care standards from models (or they are reverse engineering their standards to models) such as the HL7 Reference Information Model using Unified Modeling Language (UML).

An illustration of a life cycle in the development of model-based standards is shown in Figure 58.

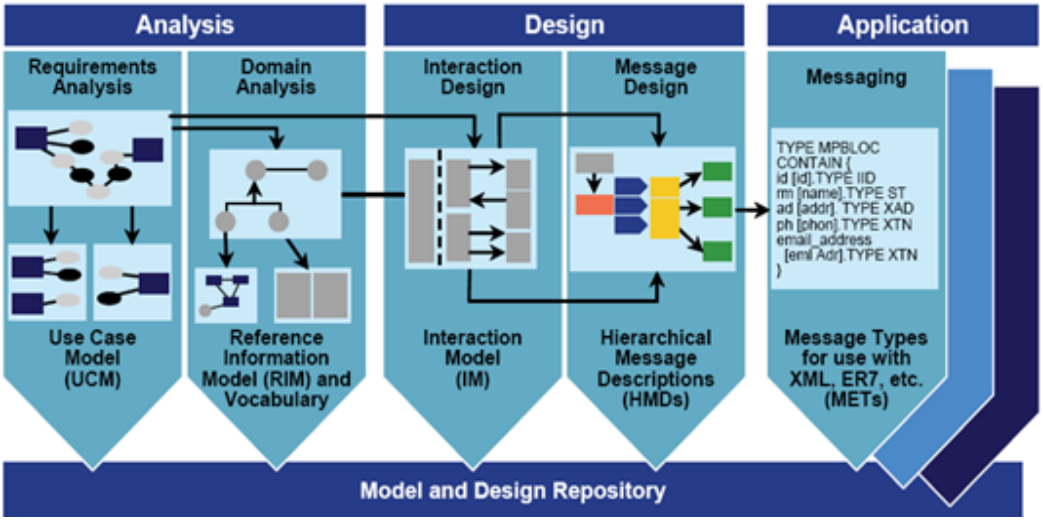


Figure 58: Development Life Cycle of Model-based Standards

Designated Standard Maintenance Organizations (DSMO)

External codes are maintained by Designated Standard Maintenance Organizations (DSMOs), which are specific organizations with responsibility for standards for electronic transactions under the HIPAA Transactions and Code Sets Rule. There are two types of codes: medical and non-medical. The DSMO role is summarized below (Figure 59).

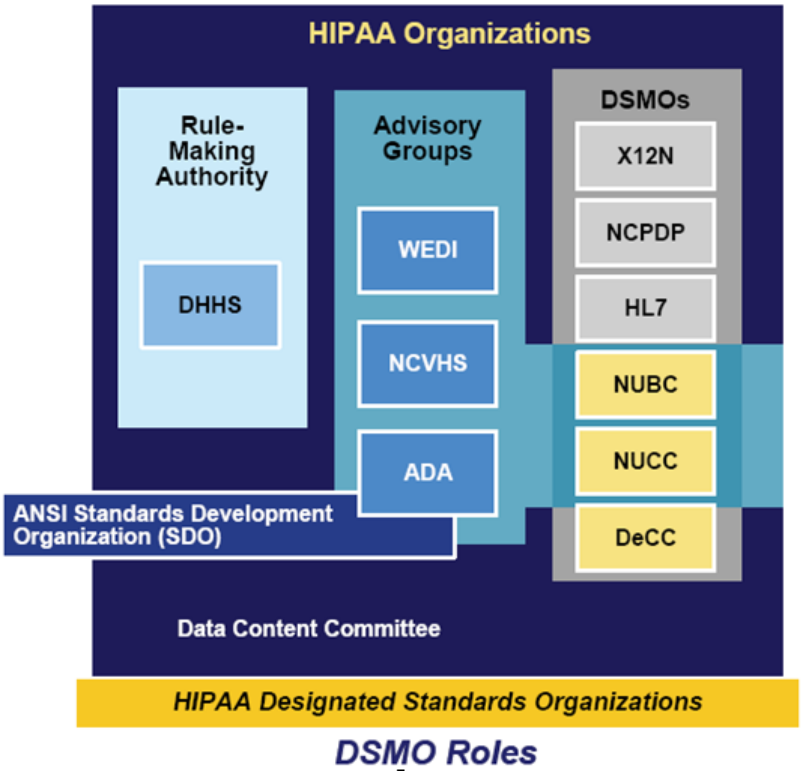


Figure 59: Roles of Designated Standard Maintenance Organizations

The data standards are critical to the successful transformation and evolution of Medicaid enterprises. The MITA data standards will help ensure that implementations are interoperable and plug-and-play capable. With participation by states, partners, and other stakeholders, the MITA data standards will become a tool to enable seamless interoperability and data sharing, which will ultimately reward state Medicaid enterprises with lower cost (through elimination of redundant or unnecessary operations), improved outcomes and reduced errors (through access to quality and outcome information), and improved stakeholder satisfaction (through self-service).

Section 7 – Technical Architecture Analysis

7.1 Overview

A Technology Architecture describes the current structure, future structure, and inter-relationships of the enterprise's technologies. As with the other architectures, the future stage of the Technical Architecture is aligned with the MITA Framework.

7.2 As-Is Architecture Analysis

Prior to examining the envisioned future of the Technical Architecture, it is important to analyze the current and evolving enterprise environments. This analysis allows for an evaluation of the existing structures and an opportunity to identify key elements for the Agency to include in the pending system procurements.

AHS' current enterprise systems, including the MMIS, do not have sufficient automation and flexibility in place to support growth towards the future MITA maturity levels. Many processes and business functions rely on the data that is captured, processed, stored, and retrieved via manual technical processes such as File Transfer Protocol (FTP). These processes result in duplication of effort and a lack of cross referenced data for Medicaid beneficiaries. For example, individuals currently eligible for Medicaid may also be eligible for services provided by one of the other departments within the Agency (i.e. DAIL, MH), but Medicaid-related data is not really available to other departments.

Since data records exist in different databases without automated data sharing or real-time data exchange across different processes within agencies, the State lacks a single comprehensive view of an individual across the range of services provided by the Agency. One of the Agency's goals is to achieve this comprehensive perspective through deployment of an SOA/ESB infrastructure.

Table 39 depicts what is working well and what is lacking in the current environment. By implementing fundamental platform services components the Agency intends to realize an environment that supports service orchestrations and data sharing across the Medicaid enterprise.

What's Working	What's Not Working
• The State has an outsourced MMIS Platform that continues to be operational and federally-certified • The State has numerous technical services platforms that house beneficiary data • The State uses staff effort to process the current work load, albeit manually. • The State deploys manual technical process to complete transactions.	• Disparate systems present unassociated silos of data. • A technical enterprise data management model has not been deployed. • The application environment consists of single sourced point solutions that do not allow for enterprise-wide, automated data sharing • Single view of a beneficiary is not

What's Working	What's Not Working
	available • Data integration with other IT systems is a manual process where data is transferred either via FTP or Tape to local, regional, or national data stores. • Unmanaged data is a risk for misinformation and security • Does not allow for process automation

Table 39: Current AHS Medicaid Enterprise Analysis

7.2.1 Desktop Environment

Information gathered during onsite meetings with the Agency's IT department team indicates that the Agency has approximately 3,200 desktop devices across all departments. A rough breakdown of these devices includes 700 laptops and 2,500 desktop devices.

Each laptop has a generalized standard configuration of Intel DualCore 2.3Ghz processors with approximately 2Gb RAM. Each desktop has the following basic elements of a standardized configuration: Intel DualCore 3.0Ghz processors; 4Gb RAM; 160Gb hard drives; and 19"+ monitors.

The Agency deploys Windows XP and the Office suite, with Microsoft Office 2003 in use across all AHS departments. Additionally, the Agency completed the upgrades associated with their Internet Explorer "IE8 Browser Standardization Project." AHS deploys approximately 400 Wyse WinTerm thin clients, which are primarily attached to a Citrix farm for application delivery. This current environment can support up to approximately 200 concurrent users connecting remotely through Citrix using RSA security software and tokens (i.e., key fobs).

The printing environment is predominantly HP devices, along with a handful of devices from other manufacturers including Imagistics and Dell. Approximately 95 percent of the printing environment is network driven.

7.2.2 Application Environment

Currently, AHS utilizes numerous applications to perform Medicaid- and health care-related functions. The exchange of information between these systems is presented in the as-is descriptions of the Business Architecture Analysis (Section 5). For the sake of clarity, the systems providing critical information to the MMIS (i.e. ACCESS) or providing functionality in the upcoming procurement, such as MaxStar and MedMetrics, are explained below in further detail. These critical applications are denoted by red text in Figure 60. **Note**: The diagram does not capture every application in use across the Agency; only the applications that perform Medicaid and health care functions are presented.

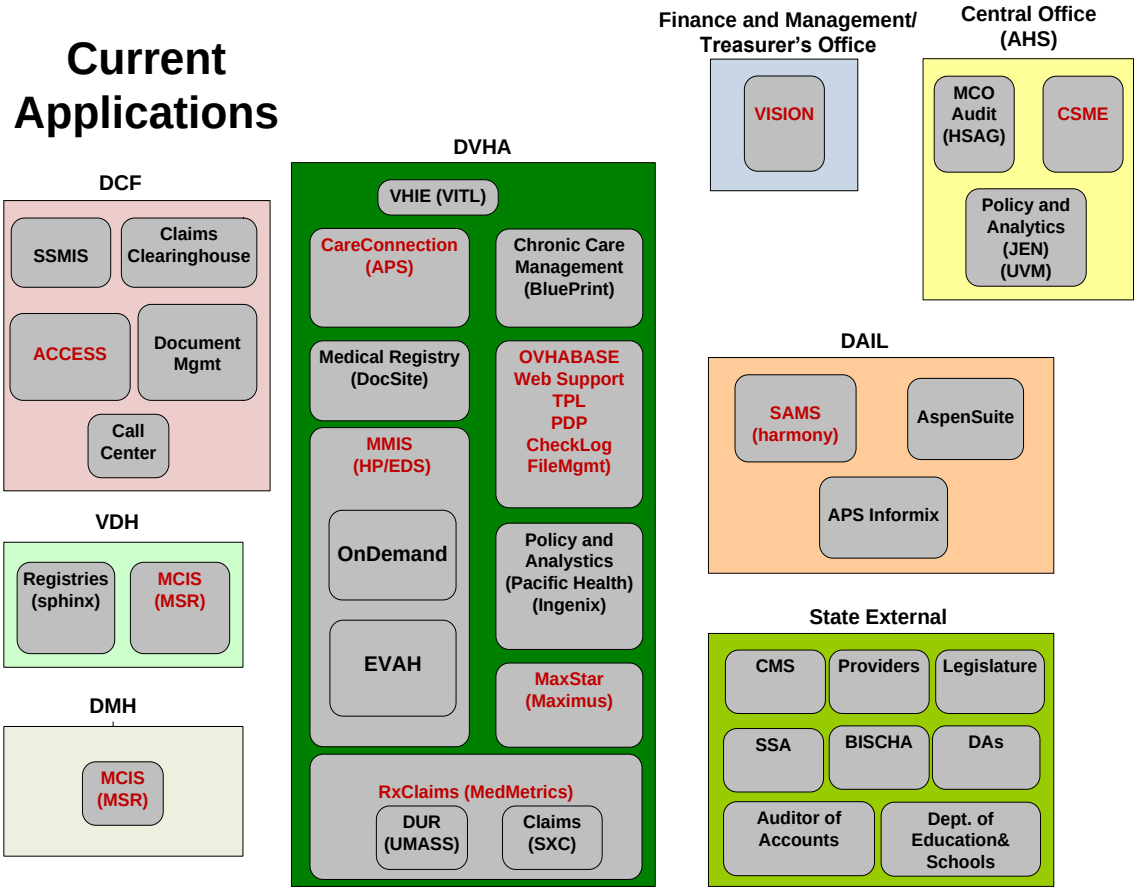


Figure 60: Business Process Mapping to MITA Architecture

The following sections contain detailed infrastructure information, when available, for those applications managed under existing contracts as well as a brief description of the system's functionality.

Medicaid Management Information System

The MMIS is a large system used to support a wide variety of activities generally included in the Operations Management business area within the MITA Framework. The MMIS is the claims processing system for Vermont's Medicaid Program. In addition to processing claims, the MMIS also supports coordination of benefits, surveillance and utilization review, federal and management reporting, and, to a limited extent, case management, member eligibility, and provider enrollment. The MMIS provides the foundation for the administration of the Medicaid Program and captures payments to providers, services provided to members and specific eligibility information that can be accessed by providers. While the MMIS supports all departments that provide Medicaid services, it is generally a siloed application based on the business processes that are performed by DVHA through its contract with HP/EDS for fiscal agent operations supporting the Medicaid program.

HP provides traditional Fiscal Agent services for the State of Vermont. The contract is scheduled to expire in December 2013. HP currently pays all provider claims, including the pharmacy claims. MedMetrics, the current PBM, processes point of service pharmacy claims and transfers the claims file to HP for further processing and payment. The services currently provided by the HP system include:

- Enrolling providers and maintaining provider data.
- Maintaining current beneficiary information by receiving and applying updates from the State's eligibility system and maintaining a current and accurate database of beneficiary information.
- Maintaining current reference information to support timely and accurate claims processing, including posting updates from interface files and online updates.
- Maintaining service authorization information by maintaining a current and accurate database of authorization information from which claims adjudication and payment will be determined.
- Accepting, adjudicating, adjusting, and voiding claims submitted by the provider community, including pharmacy claims.
- Pricing and paying claims to providers of services. The priced claims will result in payment to the providers.
- Maintaining financial records for all providers of services including remittance advice reporting, check issuance, financial adjustments, 1099 reporting, and other activities associated with financial management.
- Performing program integrity analysis and reporting including performing analysis of MES data to identify patterns of service and report abnormalities.
- Providing decision support and ad hoc reporting capabilities which are flexible and capable of providing predefined queries and reports, including program management reports. The decision support system must also have strong ad hoc query and reporting capabilities.

- Performing contract management to ensure that they remain compliant with the contractual requirements and execute corrective action to gain compliance when deficient.

The following diagrams (Figures 61, 62, and 63) show the application architecture, as well as the network and basic hardware configuration currently implemented to support the MMIS.

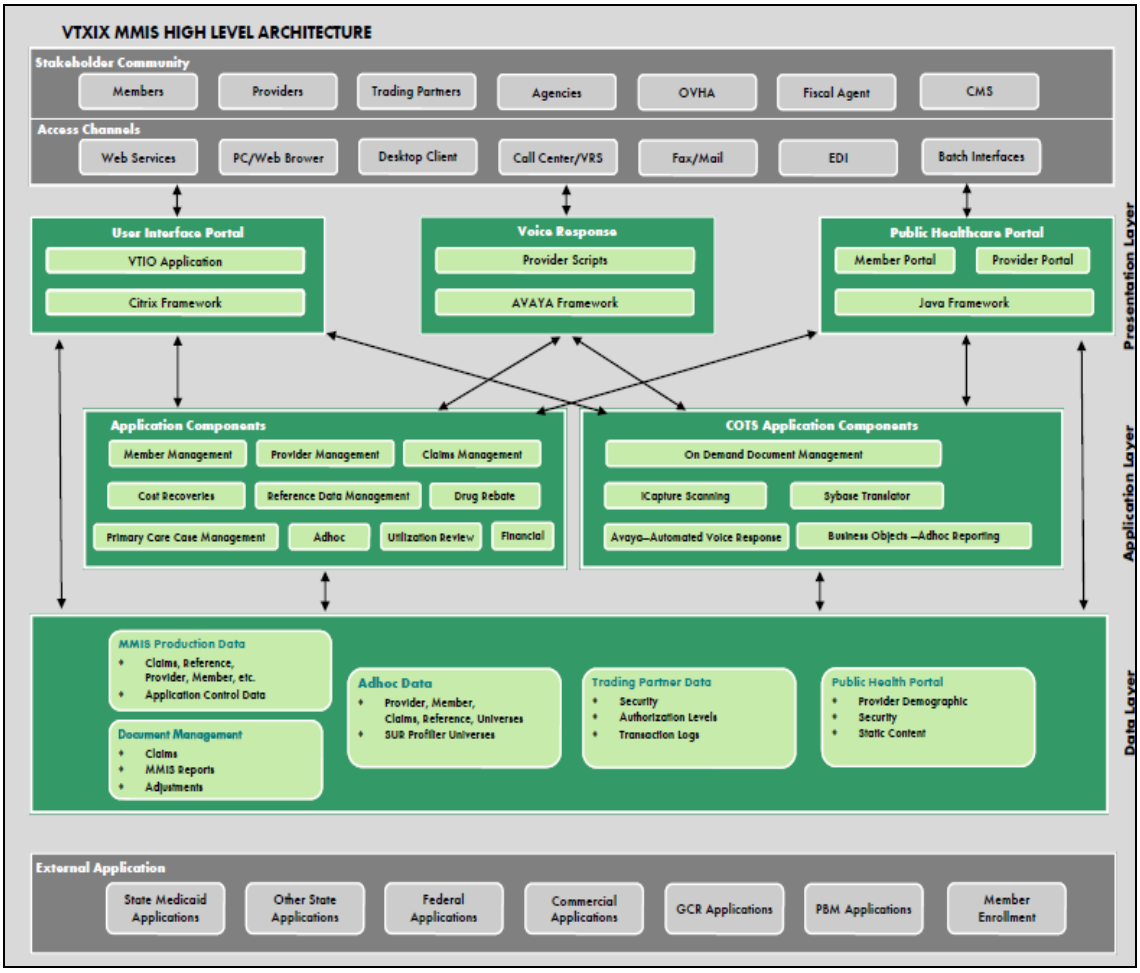


Figure 61: Current MMIS Application Architecture, Network, and Hardware Configuration

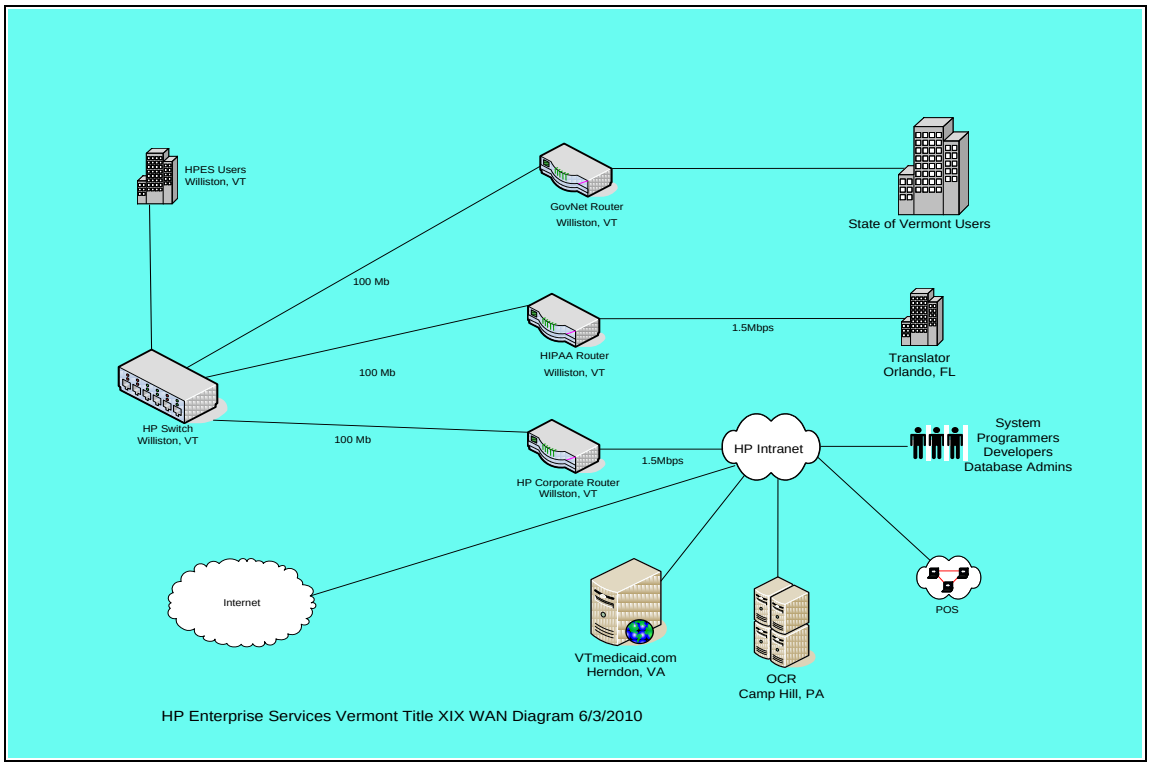


Figure 62: HP Enterprise WAN Diagram

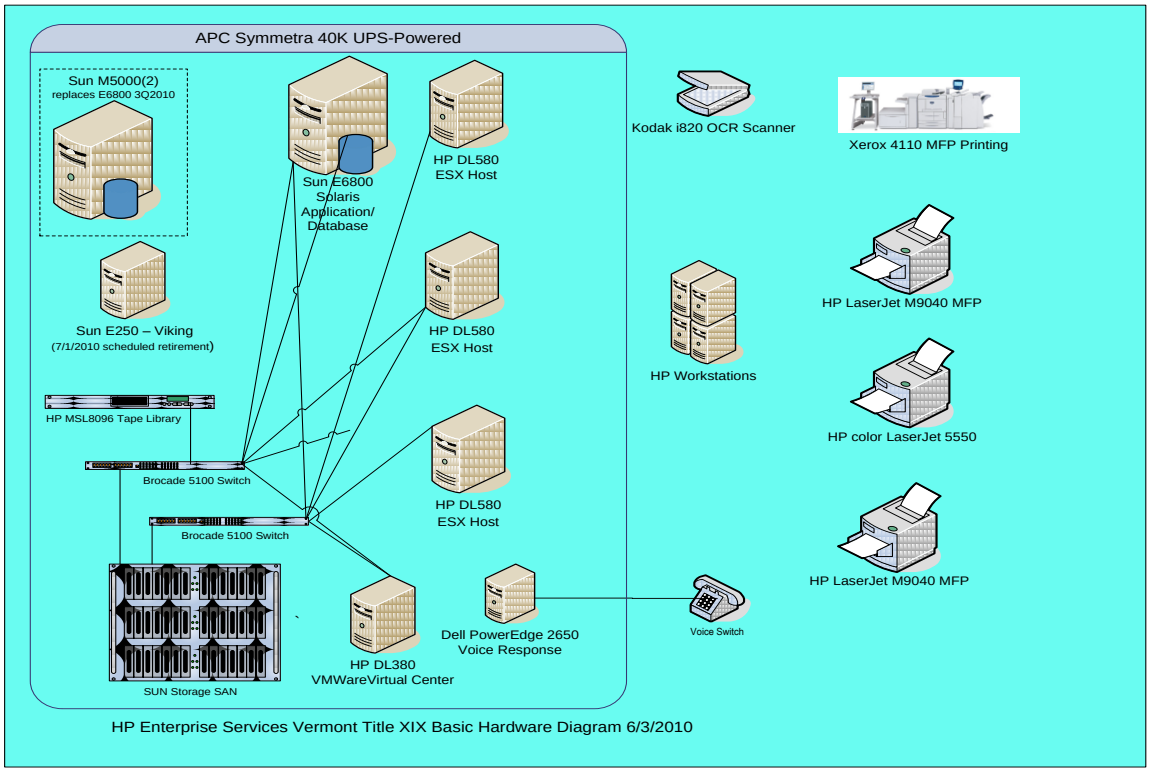


Figure 63: HP Basic Hardware Configuration

CareConnection

CareConnection is used by DVHA to administer the state's Chronic Care Management Program and Care Coordination Program for Medicaid participants. These programs are enhanced primary care case management and health information technology programs that incorporate the principles of disease management, care coordination, and case management to serve patients identified through a health risk assessment and disease stratification model. APS Healthcare is contracted to provide the system and support the CCMP.

The CareConnection applications architecture is the heart of the IT delivery engine, consisting of the applications, integration, and delivery processes for IT-based solutions. The development and delivery process is based on industry-standards to enable the organization to deliver quickly and cost effectively. The following attributes describe this architecture:

- **Multi-platform** – The delivery team has the capability to support the best platform for the customer, from desktop to Windows Server to Unix-based server solutions.
- **Agile** – The solutions developed are built with significant self-service configuration, allowing the business to configure the solution to meet customer requirements thereby reducing the amount and time of IT investment needed. Additionally, by following industry standards APIS and technologies, IT is able to quickly integrate solutions.
- **Methodology** – The IT organization operates on defined, industry-standard processes and methodologies, selecting the appropriate process for the situation. Example methodologies include the use of a Project Management Office (PMO), Project Management Institute (PMI)-based project management methodology, Rational Unified Process or RUP-based waterfall development methodology, and SCRUM-based iterative development methodology.
- **Quality Assurance** (QA) – All processes and releases go through a disciplined QA process, including the use of a dedicated QA organization.

APS has a world-class data architecture, leveraging the extensive skills of experienced data architects. All data is managed through an Enterprise Information Architecture, which is focused on movement, management, enrichment, and consumption of data. APS employs Data Quality Management (DQM) for ensuring, maintaining, and improving the quality of data as it flows throughout the organization. The following attributes describe the data architecture:

- **Architected** – Data and information flows through applications using a purposeful, managed approach that takes the enterprise into account to maximize the value and structure of data. Data is fed into an Operational Data Store using extract-transform-load (ETL) tools and applying semantic resolution, then structured in Data Warehouses for analytics and reporting.

- **Security** – Given our commitment to members and patients, privacy and security information is managed by Service Level Agreements (SLAs), auditing and metrics development which appropriately measures confidentiality, integrity, and availability (CIA). Preventive, detective, and corrective security controls are used to assure security of information.
- **Performance** – The APS data architecture is architected to support very high volumes of data with excellent system performance and responsiveness which increases staff productivity.

APS supports a multi-platform physical architecture at the server level. All servers are rack-mounted with managed interfaces in a controlled environment. The APS infrastructure focuses on maintaining a low total cost of ownership and high business resilience. Industry standard technologies are deployed, including virtualization, blade centers, distributed power management, enterprise storage management, and enterprise backup. The vendors of choice are IBM and Dell for Intel and UNIX-based systems. The data center is located in Brookfield, Wisconsin, a suburb of Milwaukee.

The diagram below (Figure 64) depicts the high-level processes performed by the APS CareConnection system.

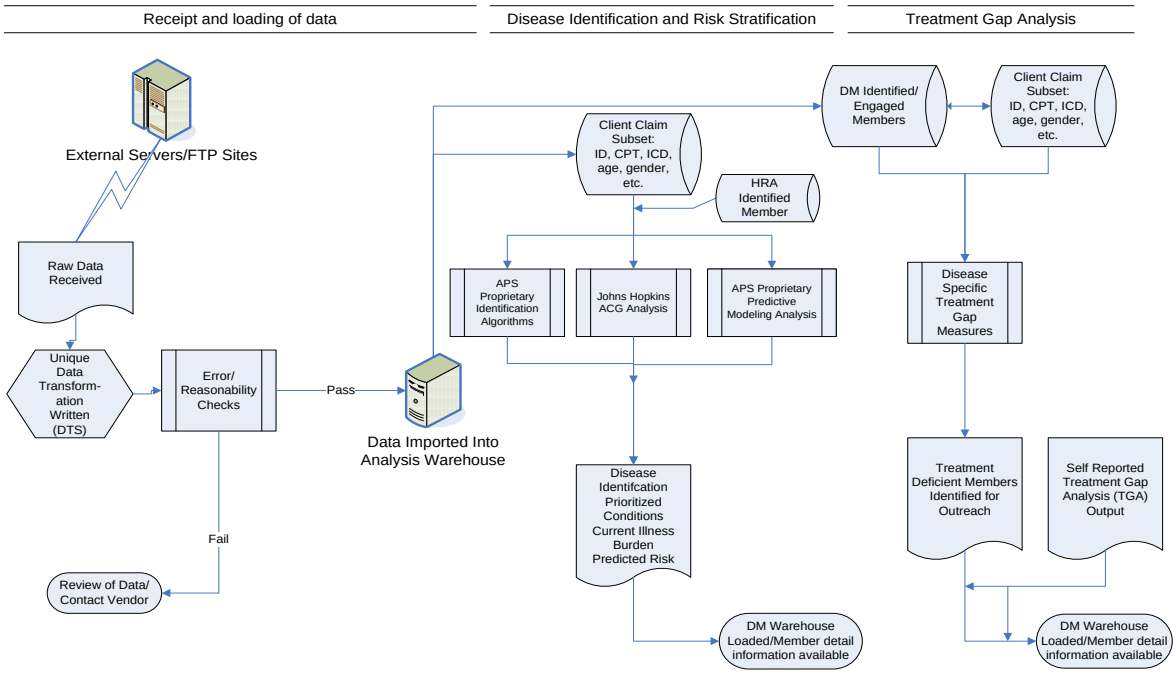


Figure 64: APS CareConnection

MAXSTAR

MAXSTAR is provided by MAXIMUS, Inc. under a contract with DVHA to provide a call center for health care clients. The business processes supported are generally

included in the Member Management business area within MITA and are specific to the operational contract functions that MAXIMUS provides. The MAXSTAR application manages the Health Care Call Center call log, PC+ Providers lookup, list of callers requesting mailings, and Managed Care notices processing. Call center representatives enter basic information about each call into Helpline screens. This information is used for tracking, reporting, and sending requested forms to clients.

Since 1995, DVHA and MAXIMUS have collaborated to develop work plans, policies, procedures, and systems to provide outreach, enrollment activities, and member services to Medicaid beneficiaries. MAXIMUS provides helpline operations, outreach, and education to potential enrollees, and assistance to those inquiring about Medicaid health programs. DVHA performs member services internally for some enrollment and premium functions.

MAXIMUS performs ongoing enrollment and education activities, project coordination, technical analysis, data collection quality assurance, and reporting tasks, which include:

- Telephone access for members and other interested parties, including:
  - Live telephone support by trained staff during normal business hours, Monday through Friday except for holidays
  - Teletypewriter (TTY) communication, relay service, and language translation, as specified by the State
  - Establishing and maintaining sufficient toll-free phone lines to support member inquiries
- Outreach activities to provide information to members, providers, and other interested parties regarding the State's health care programs.
- Education activities to provide information about program policies and benefits to individuals, enrollees, and benefits counselors.
- Enrollment activities to assist members with health plan enrollment.
- Other activities including:
  - Tracking and reporting on calls
  - Updating member data in the MMIS
  - Notifying DCF of changes in household information

RxClaims

DVHA contracts with MedMetrics of Worcester, Massachusetts as the PBM for Vermont's programs. MedMetrics is a non-profit, full-service pharmacy benefit manager wholly owned by Public Sector Partners (PSP) and affiliated with the University of Massachusetts Medical School and the University of Massachusetts Memorial Medical Center. MedMetrics was selected as DVHA's PBM contractor through a competitive bid process in 2005. The current contract with MedMetrics runs through December 31, 2012.

RxClaims (RxC) is the system utilized by MedMetrics. RxC is the point of service system used by pharmacies to process pharmacy claims in real time. This system is able to confirm: eligibility, other insurance, physician/pharmacy lock-ins, and the status of pharmaceutical prior authorizations; all at the time of service. The State's fiscal agent, HP/EDS then processes the actual pharmaceutical claims payment on a weekly basis.

MedMetrics performs the following services for DVHA:

- Operation of a Clinical Call Center twenty-four hours per day seven days a week.
- Managing the Preferred Drug List (PDL).
- Coordinating Drug Utilization Review Board activities.
- Administering the State Maximum Allowable Cost (SMAC) program.
- Accepting POS drug claims according to the rules of coverage under Vermont programs.
- Providing mechanisms to support the application of generic and alternative drug requirements authorized by Title 18, Chapter 91 of the Vermont statutes.
- Transmitting program requirement messages to pharmacies as drugs are dispensed and claims are processed. These include eligibility verification, federal/state drug rebate requirements, coverage limitations, prior authorization needs, prospective and retrospective drug utilization review (DUR), and issue resolution.
- Coordinating and supporting the Drug Utilization Review Board activities.
- Managing the multi-state supplemental rebate program.
- Authorizing payments according to reimbursement rules.

Claims are submitted by pharmacies enrolled to provide benefits in State programs. As of June 2010, 258 pharmacies were enrolled and processing claims. The following diagrams (Figures 65, 66, and 67) depict the existing application architecture of RxC.

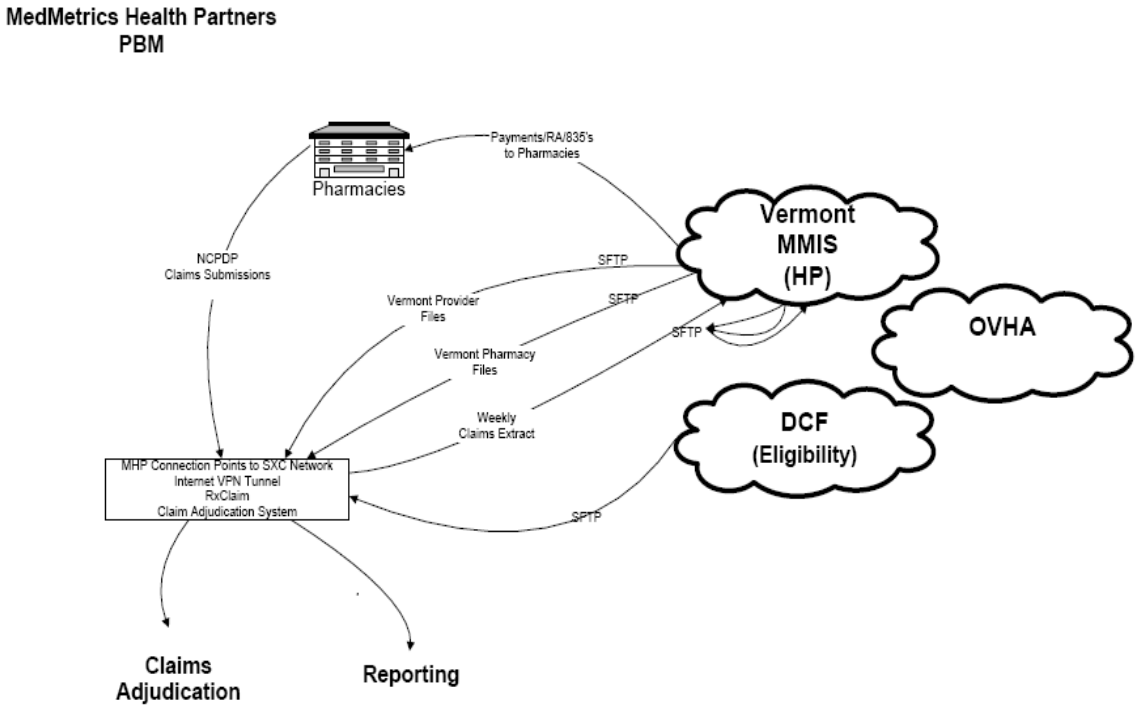


Figure 65: MedMetrics Health Partners PBM

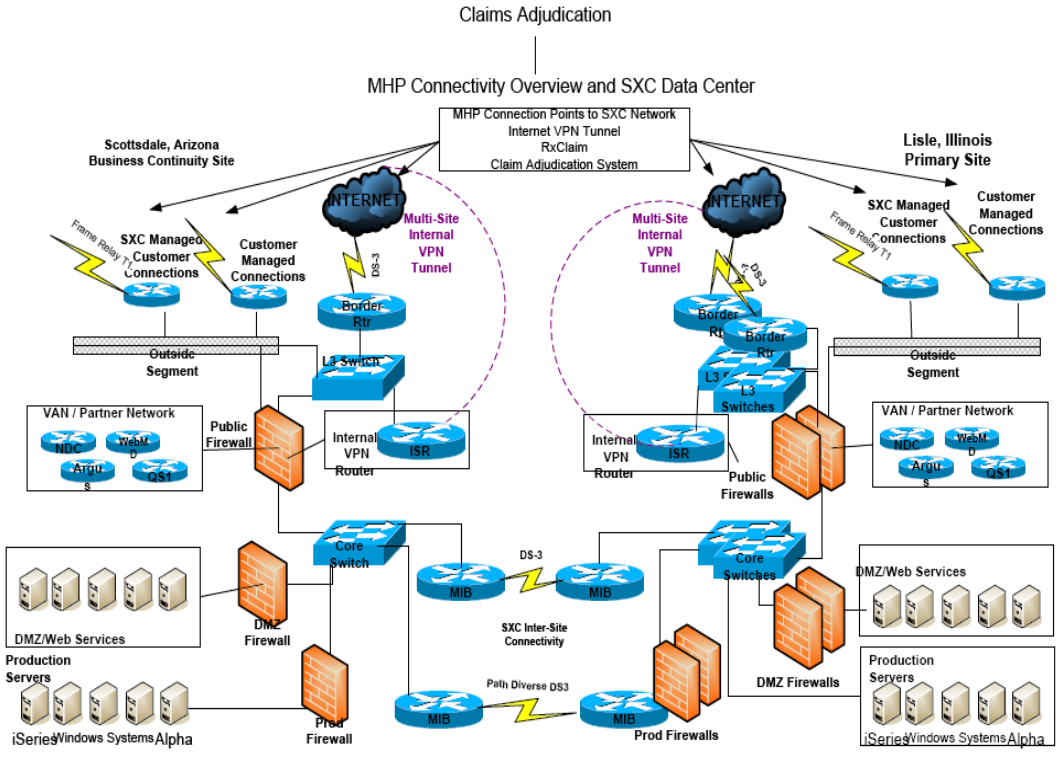


Figure 66: Claims Adjudication - MHP Connectivity& SXC Data Center Overview

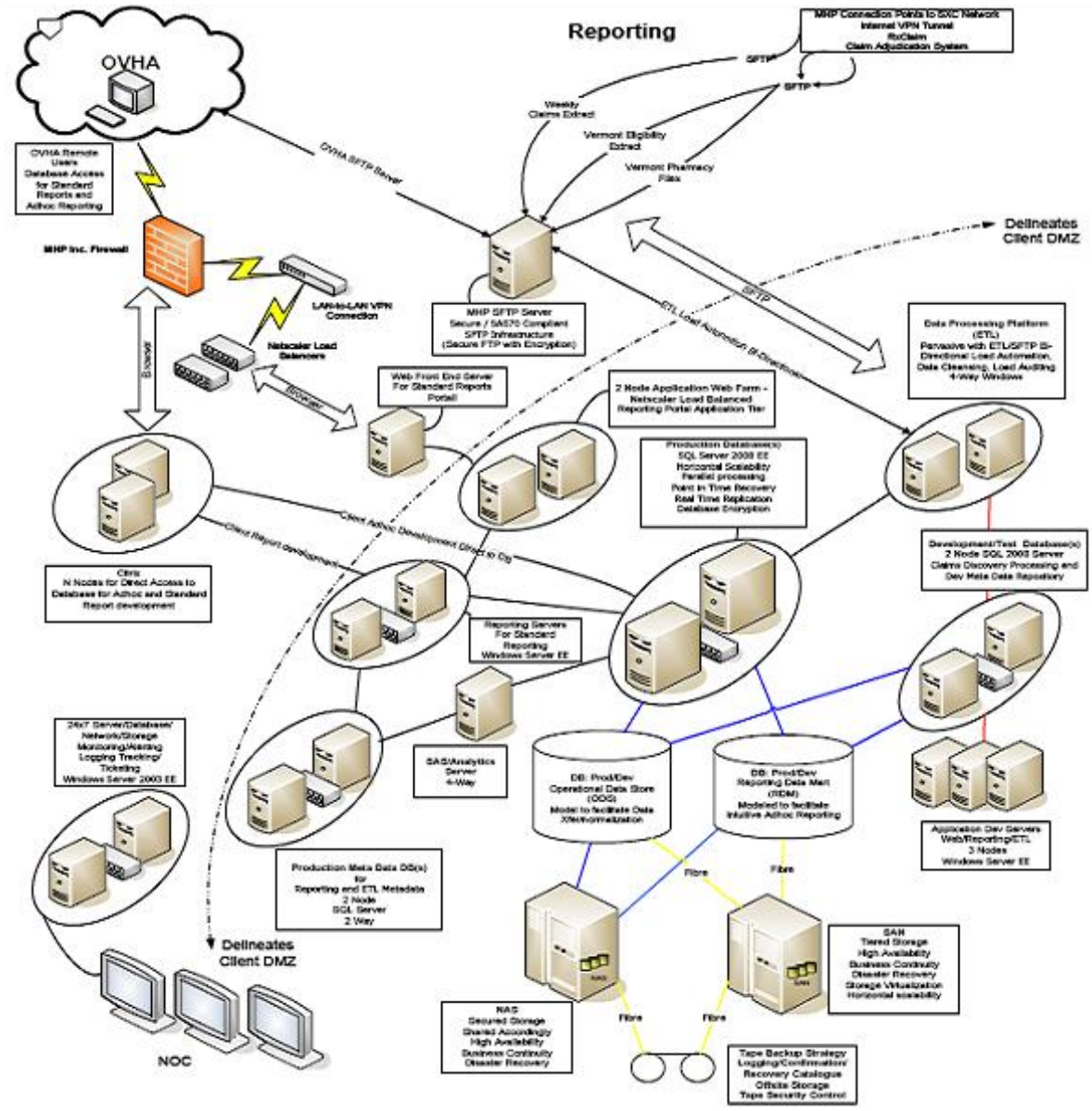


Figure 67: RxClaims Adjudication–MHP connection points to SXC Network & VPN Tunnel

Below is a brief description of each of the areas contained within RxC.

- **Eligibility / Other Insurance** – These are just two of a myriad of components which are updated on a nightly basis as part of the data transfer process from the State's eligibility system, ACCESS, to its billing systems, RxC and the MMIS.
- **Physician / Pharmacy Lock-ins** – Designated members of DVHA's Program Integrity Unit utilize the RxC for physician/pharmacy lock-ins. The PI Unit has certain criteria used to determine if a beneficiary is high risk. After this determination, they are able to generate pharmacy and/or physician lock-ins within RxC to limit who can write a prescription for the beneficiary and where s/he can fill that prescription.

- **Prior Authorizations –** The State in conjunction with its PBM has created a preferred drug list that signifies which prescriptions require prior authorization and which do not. The clinical staff of MedMetric's prior authorization team processes these requests as they are submitted by Medicaid providers. The provider and beneficiary are notified of the outcome and the authorizations are entered into the RxC for claims possessing.

RxC is also utilized by the Vermont Health Access Member Services provider, MAXIMUS, to respond to inquiries from consumers. Typically, beneficiaries call MAXIMUS to find out why a prescription was denied at the pharmacy, to check on the status of a prior authorization request, or to find out the process for changing a pharmacy or physician lock-in.

DVHABASE

DVHABase is an application platform for developers and administrators, providing interfaces for authentication, authorization, and web session state management, as well as the functionality for some of the user interface, such as the tree view control seen on all local websites. It serves as the foundation and developer's API for four of the local DVHA systems: Business Administration, COB-PDP, COB-TPL, and Clinical.

The DVHABase database is critical to the operation of all other applications. Specifically, the tables for users, permissions, session variables, and global hyperlinks are used to dynamically drive web content for all other systems with the exception of Green Mountain Care.

ACCESS – Integrated Financial Eligibility System

ACCESS is the automated computer system that allows AHS to administer a variety of State and federal assistance programs that address the basic needs of the residents of Vermont whose financial means do not adequately provide for themselves or their dependents. Programs are designed to respond to various factors such as unemployment, part-time or low wages, lack of education, family break-up, unmarried parenthood, advanced age, disability or death of a family member, and/or other catastrophic events affecting family members. It provides critical and central financial eligibility services that cut across departments and business units. The components of the system related to the Medicaid enterprise are the financial eligibility functions for the programs funded by Medicaid and other State health care initiatives such as Catamount Health. This system also provides spend-down information and premium requirements for members who are eligible for Medicaid and other health care programs.

Payment Error Rate Measurement

The Payment Error Rate Measurement system (PERM)is a manual framework that stores data passed from ACCESS and prepares a report of the data to be passed in flat file format to the MMIS. This system broadly supports business processes included in the Operations Management business area with the MITA Framework because the data contained in the interface between the MMIS and ACCESS is required for many business processes in this area.

Social Assistance Management System

The Social Assistance Management System (SAMS) is used by DAIL to support clinical eligibility as well as care and case management activities. Many of the principal business processes it supports are included in the Care Management business area within the MITA Framework. SAMS is a web-based application used to manage enrollment and service authorization for the Choices for Care Program, Attendant Services Program, and the Adult Day Services Program. It also manages assessment information and consumer interviews across DAIL. While the system supports a wide variety of both Medicaid and non-Medicaid programs, the system is used only by DAIL to support their business processes. It does not include automated interfaces with ACCESS for clinical eligibility data or the MMIS for plans of care or service authorization data.

MSR

The Monthly Service Reports (MSR) system is used by DMH and VDH to track mental health services, developmental services, and alcohol and drug abuse program (ADAP) services. It receives a monthly file from the Designated Agencies (DAs) and the Specialized Services Agencies (SSAs).

VISION

VISION is the financial and human resource (HR) information management system currently operated by the State Treasury, which integrates numerous modules of functionality. This system contains all of the budget and pay out information related to the MMIS. Currently, the MMIS issues a warrant to all departments for review and validation. Once the amounts have been validated, a department representative enters information into VISION to establish an Electronic Funds Transfer (EFT). This is then drawn down by the MMIS during the creation of checks to providers, etc. for services rendered.

AHS Central Source for Measurement and Evaluation Data

The Central Source for Measurement and Evaluation system (CSME) is the existing data warehouse for the Agency. Currently, this repository captures and presents information

at an individual level; the intent of the current ETL logic is to provide a view of an individual and that person's interactions with the different departments of the Agency. There has been discussion around expanding the information to present this information at a household and/or individual level, but these modifications are still in the planning stages. The following diagrams (Figures 68 and 69) provide a high-level explanation of the ETL process followed by the information currently available within CSME.

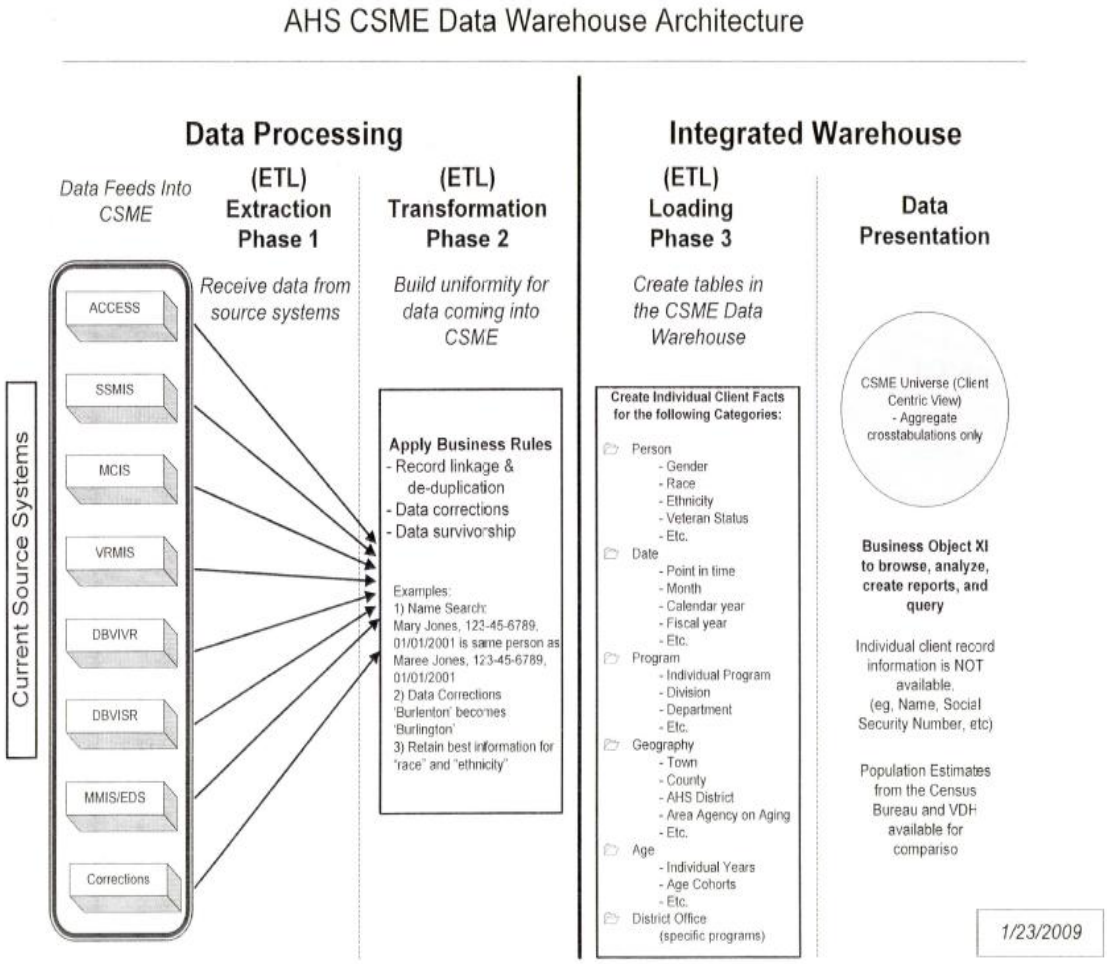


Figure 68: AHS CSME Data Warehouse Architecture

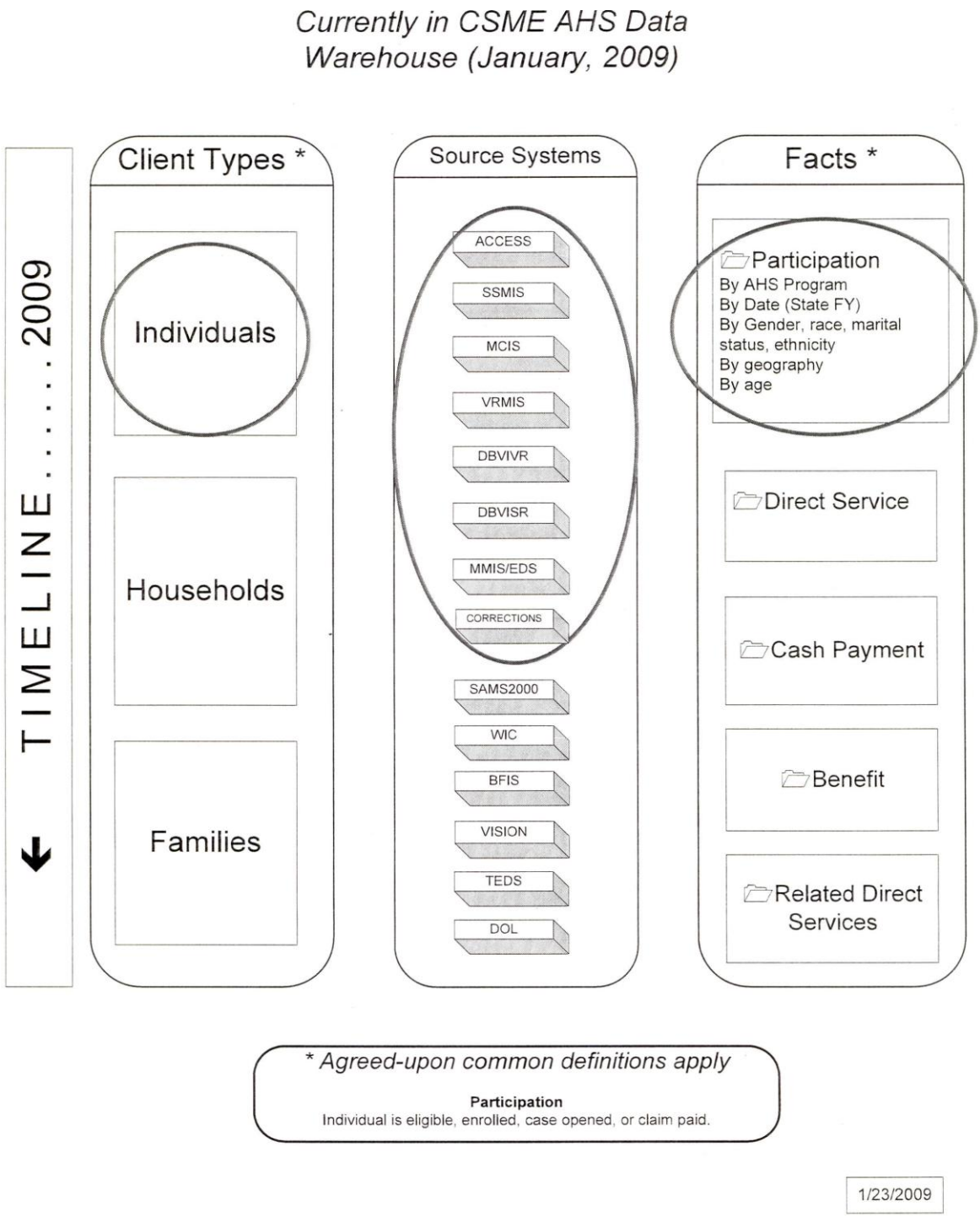


Figure 69: Current AHS CSME Data Warehouse

7.2.3 Server Environment

The State has approximately 270 servers across all AHS departments. Of these servers, an estimated 139 have been virtualized and placed in a virtual server farm. The server counts based on the most recently available data are shown in Table 40.

Manufacturer/OEM	Count
VMWare	139
Appliance	5
Compaq	3
Dell	26
HP	80
Undocumented	18
Total	**271**

Table 40: AHS Departments Server Count

Based on available data, the State has an overall server consolidation ratio of approximately two servers per physical box, or 2:1. Removing the appliances and undocumented servers from the equation, that ratio improves somewhat to less than 2.5:1.

7.2.4 Storage Area Network Environment

The Storage Area Networks (SANS) within AHS use both Fibre Channel and iSCSI technologies. The Fibre Channel SANs are located in Waterbury and Burlington. The Waterbury SAN is an EVA 6000 with 112, 146GB Fibre Channel drives and one MSL 6030 Fibre Channel tape library using two Ultrium 960 (LTO-3) drives.

The Burlington SAN is an EVA 6100 configured with 28 Fibre Channel drives @ 146GB capacity and eight 1GB Fibre ATA drives. The Fibre Channel tape library located in Burlington is a MSL 6030 Fibre Channel tape library with one Ultrium 960 (LTO-3) drive. These SANs are used as storage for virtualization with vSphere 4.0, various database servers and Exchange, along with their messaging program.

Replication between the two sites does not occur, due to lack of replication software, space limitations on each SAN, and bandwidth limitation issues.

The iSCSI SANS use HP's LeftHand as primary and secondary storage for the Onbase imaging system. A third unit is in production providing off-site storage for backups and snapshots using LeftHand's built-in replication features.

The EVA 6000 and 6100 SANs are currently approaching maximum capacity and end-of-life, and are in the process of being replaced and/or upgraded. At the time of data collection the EVA 6000 in Waterbury has less than 500GB of space remaining; AHS is

currently evaluating the purchase of an EVA 6400, which has a maximum RAW capacity of 129.6TB to a minimum RAW capacity of 31.536TB using 600GB Fibre Channel drives. The EVA 6100 in Burlington has four full drive enclosures with four additional enclosures available. AHS has purchased additional drives to increase its existing capacity.

7.2.5 Data Center Environment

AHS currently utilizes two data centers in Burlington and Waterbury. AHS is in the planning stages of relocating its systems from the Burlington data center to the Waterbury facility. The longer term goal is migration of all systems to the National Life data center in Montpelier, in order to consolidate all data centers within the State into one primary site (National Life) and one backup (McFarland House).

The Agency intends to evaluate options with the pending procurements, such as partial redundancy to all elements (power, cooling, network connectivity, security), being fully fault tolerant.

7.2.6 Network Environment

The network environment is analyzed and described in two sections: Wide-Area Network (WAN) and Local-Area Network (LAN). Some of the responsibilities for these networks are managed by the State of Vermont, not AHS, but this information is included to provide context on the current operating environment in Vermont.

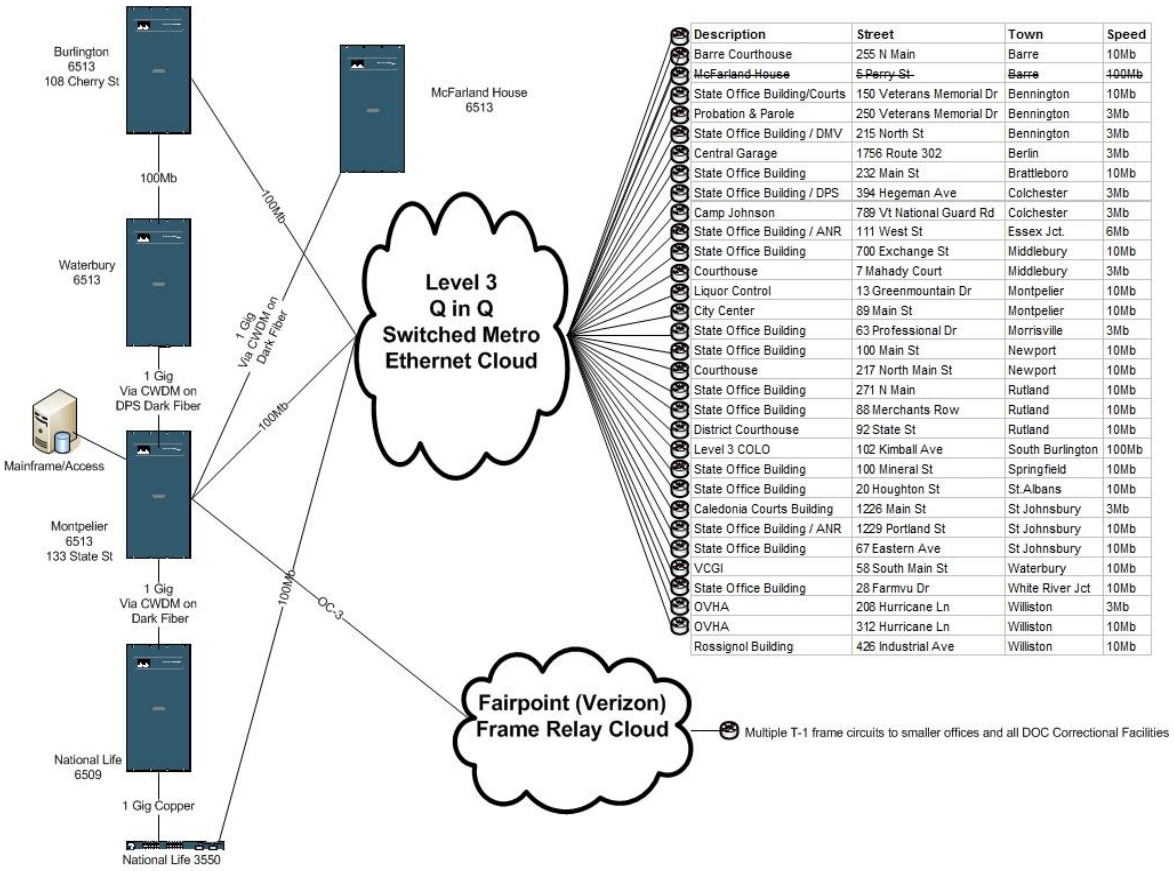
Wide-Area Network

AHS uses the State of Vermont GovNet for their Wide Area Network connectivity and access to the Internet. GovNet uses Level 3 Switched Metro Ethernet Cloud using 100Mbps connections to the Burlington, Montpelier, and National Life data centers.

A primary circuit links the Waterbury and Montpelier data centers and the Montpelier and the National Life data centers, running at 1Gbp/s using dark fiber running Coarse Wave Division Multiplexing (CWDM), which is a cost-effective method for transmitting signals over unused fiber pairs. The Burlington and Waterbury data centers are connected via a direct 100Mbps connection. In the event of a failure of the primary circuit, failover routing through GovNet is accomplished. The connectivity to McFarland House is via a 1Gbp/s connection through the Montpelier data center. Diagrams provided do not reflect a redundant connection through GovNet or a direct connection to the National Life data center.

The HP/EDS MMIS data center, located at 312 Hurricane Lane within the DVHA building, is directly connected to the GovNet backbone.

Each of the data centers is standardized on Cisco 6500 series switches with 6513 switches. The National Life data center currently uses a 6509 switch. All WAN circuits terminate within the 6500 series switches. The Waterbury Data Center includes 1Gbp/s circuit termination for remote offices. The diagram below (Figure 70) represents the existing WAN architecture.



Description	Street	Town	Speed
Barre Courthouse	255 N Main	Barre	10Mb
~~McFarland House~~	~~5 Perry St~~	~~Barre~~	~~100Mb~~
State Office Building/Courts	150 Veterans Memorial Dr	Bennington	10Mb
Probation & Parole	250 Veterans Memorial Dr	Bennington	3Mb
State Office Building / DMV	215 North St	Bennington	3Mb
Central Garage	1756 Route 302	Berlin	3Mb
State Office Building	232 Main St	Brattleboro	10Mb
State Office Building / DPS	394 Hegeman Ave	Colchester	3Mb
Camp Johnson	789 Vt National Guard Rd	Colchester	3Mb
State Office Building / ANR	111 West St	Essex Jct.	6Mb
State Office Building	700 Exchange St	Middlebury	10Mb
Courthouse	7 Mahady Court	Middlebury	3Mb
Liquor Control	13 Greenmountain Dr	Montpelier	10Mb
City Center	89 Main St	Montpelier	10Mb
State Office Building	63 Professional Dr	Morrisville	3Mb
State Office Building	100 Main St	Newport	10Mb
Courthouse	217 North Main St	Newport	10Mb
State Office Building	271 N Main	Rutland	10Mb
State Office Building	88 Merchants Row	Rutland	10Mb
District Courthouse	92 State St	Rutland	10Mb
Level 3 COLO	102 Kimball Ave	South Burlington	100Mb
State Office Building	100 Mineral St	Springfield	10Mb
State Office Building	20 Houghton St	St.Albans	10Mb
Caledonia Courts Building	1226 Main St	St Johnsbury	3Mb
State Office Building / ANR	1229 Portland St	St Johnsbury	10Mb
State Office Building	67 Eastern Ave	St Johnsbury	10Mb
VCGI	58 South Main St	Waterbury	10Mb
State Office Building	28 Farmvu Dr	White River Jct	10Mb
OVHA	208 Hurricane Ln	Williston	3Mb
OVHA	312 Hurricane Ln	Williston	10Mb
Rossignol Building	426 Industrial Ave	Williston	10Mb

General Topology for Vermont State Government Wide Area Network (GovNet)

Figure 70: General Topology for Vermont State Government WAN

Local-Area Network

Within the AHS Waterbury data center, the server farm switching core is a stack of Cisco 3750G switches which is uplinked into the 6513 through a 4Gbp/s Etherchannel trunk. Each of the 3750G switches is powered using redundant DC power supplies. The following diagram (Figure 71) is representative of the layout of the server core and the WAN distribution from the Waterbury Core Switch through Burlington Telecom.

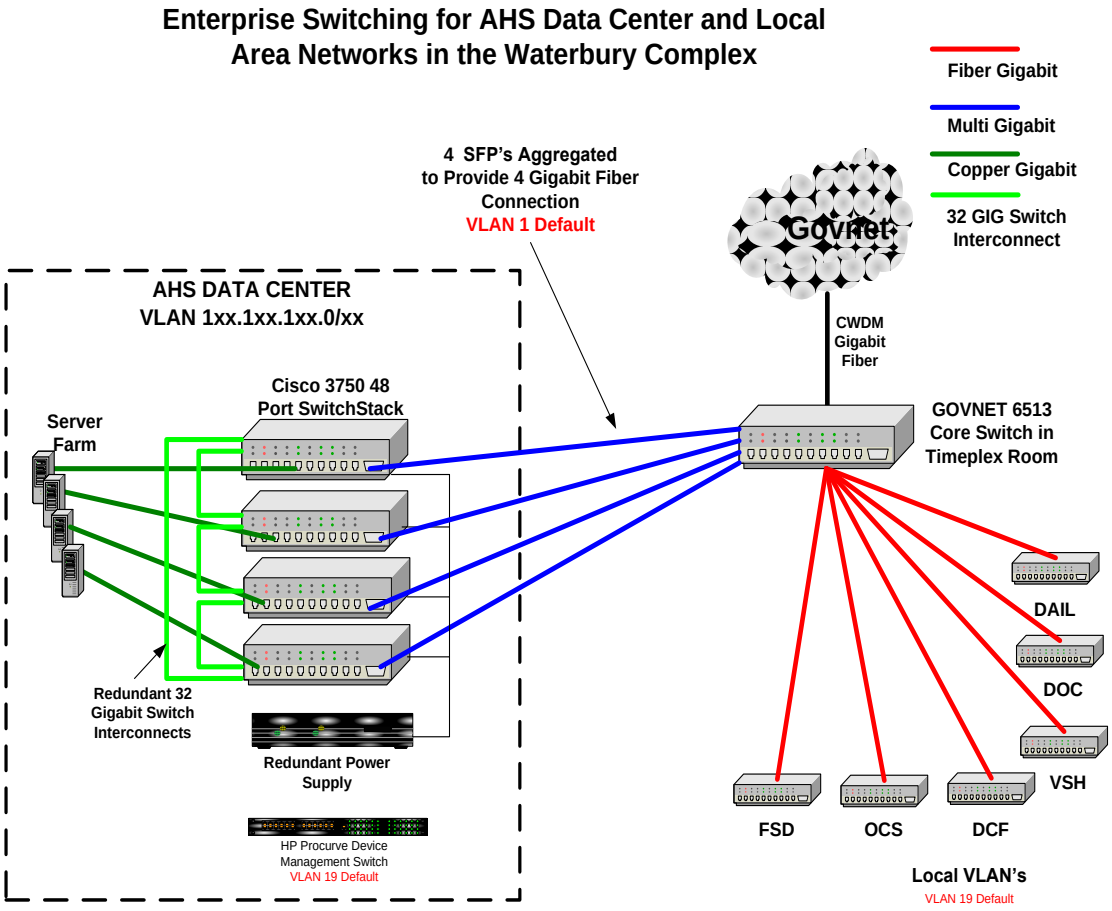


Figure 71: AHS Data Center Core Switch

The Burlington Data Center Server core switching is homed directly to the GovNet 6513 Core Switch, as shown in Figure 72.

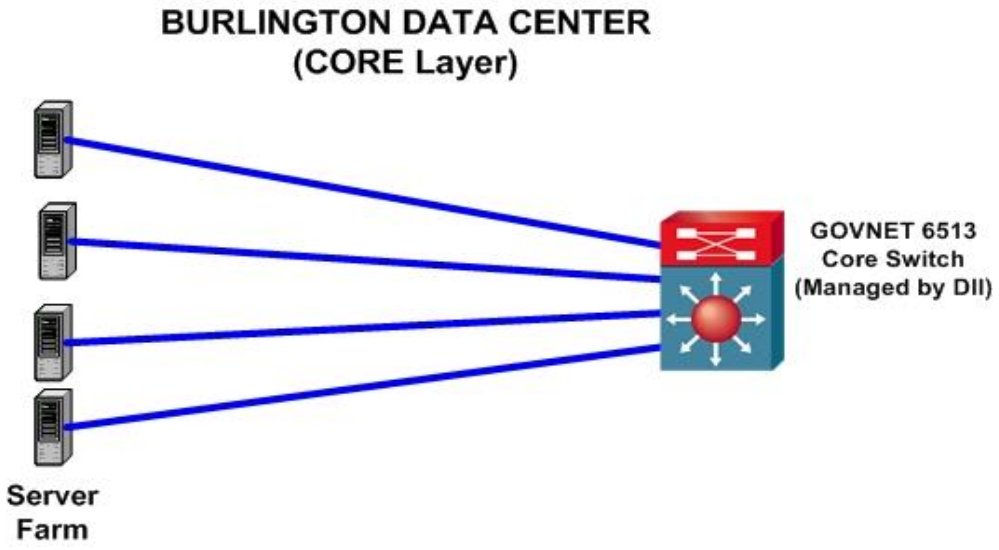


Figure 72: Burlington, VT – Data Center

The AHS Local-Area Network (LAN) environment in Waterbury comprises a star topology from the core 6513 using a 1Gbp/s backbone with the exception of the Penthouse which is on a 100Mb link. The following diagram (Figure 73) shows the layout of the Waterbury LAN.

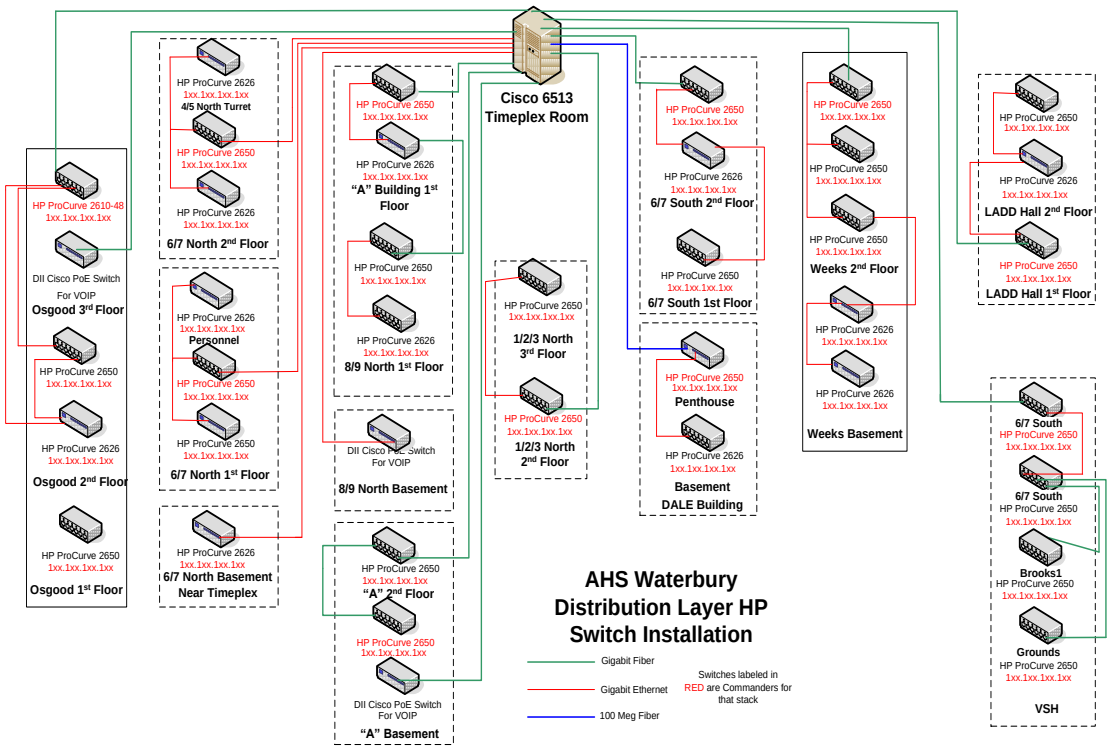


Figure 73: AHS Distribution Layer HP Switch installation

The Burlington LAN is configured in the same manner using a 1Gbp/s backbone, as represented by the following diagram (Figure 74).

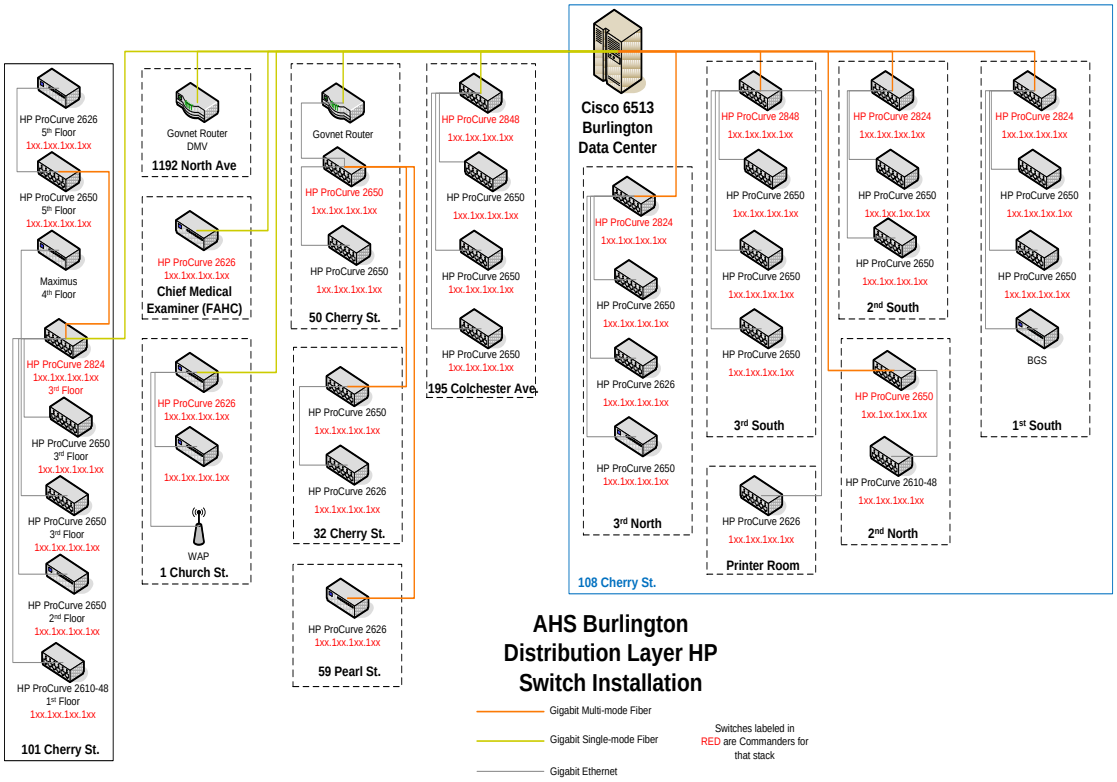


Figure 74: Burlington, VT – LAN Configuration

7.2.7 Business Continuity/Disaster Recovery

AHS intends to define operational elements and service level agreement (SLA) requirements necessary to meet business continuity (BC) and disaster recovery (DR) requirements. DR SLAs will address ownership, maintenance, and recovery of infrastructure and applications. This can be facilitated through the completion of an operational risk assessment on the current infrastructure, workflow processes, and data information. Upon completion of this assessment by AHS, preliminary data can be utilized to define acceptable SLA requirements including acceptable Recovery Point Objectives (RPO) and Recovery Time Objectives (RTO). The RPO is the maximum acceptable data loss during a system failure. This can be defined in time, number of transactions, or other criteria that AHS needs to use to maintain health care services. RTO is the amount of time necessary to restore systems to their pre-disaster state.

The acceptable measure of risk is determined by RPO and RTO values. Each of these values represent key targets that drive the technology and implementation choices for system design, deployment, and monitoring which drive business resumption planning, backup/recovery/archival services, and recovery facilities and procedures.

The key driver for AHS will be the cost of the solution relative to the designated SLA requirements and the acceptable level of risk for an outage. If the analysis determines that an extremely low RPO is required, the cost to maintain a highly available, fault tolerant system increases linearly.

7.3 Evolving Architecture Analysis

AHS is in the process of procuring key foundational components to support the further development of a SOA-based Enterprise Architecture through an RFP for "Service Oriented-Architecture Infrastructure Components." As of the time this document was written, the State had selected Oracle as its solution vendor and was in the process of negotiating a contract to procure these services. The following extract from the RFP describes the evolution currently underway as the Agency moves towards realizing its goal of a "health care enterprise" based upon MITA and SOA principles.

"The State Health Information Exchange (HIE) provides the infrastructure necessary to transfer and map data seamlessly, timely, and securely via EDI, and establish rules to govern what the data means and how it can be used. It is essential that the State develop the ability be able to provide this rapid and judicious exchange of data via the transformation hub (generally referred to as a Rules Engine). However, the State also needs the ability to probe and analyze this data in order to:

- *Transform claims transactions allowing for recording and tracking of provider information enabling the State to account for:*
  - *Identify potential providers eligible for enhanced payments;*
  - *Monitoring of providers to eliminate 'double dipping,' which is particularly significant as Vermont has a number of providers that provide services across the State's borders; and*
  - *Distinguish provider types and provider associated agencies.*
- *Transform claims transactions allowing for the recording and tracking of beneficiary information allowing the State to account for:*
  - *Identifying clinical findings and rendered services for treatment monitoring;*
  - *Auditing and investigating beneficiaries to reduce fraud and pharmacy abuses, especially since Vermont has a number of providers that provide services and supplies across the State's borders;*
  - *Reporting and evaluating beneficiary data regarding outcomes; and*
  - *Effective transmission of Continuity of Care Record (CCR), Continuity of Care Document (CCD), and other federal prescribed data files."*

The Rules Engine will provide a foundation for eligibility in its broadest sense, applying rules structure to policy to enable consistent derivation of eligibility conditions, and benefits whether for health care or for inmate release (sentence computation).

The Enterprise Services Bus will ensure that data and information is routed to the appropriate component; multiple data formats are mapped correctly; and streamline data integrity. ESBs are scalable both vertically, to provide facilities for individual services, and horizontally, to provide available services across AHS. The robust functionality of the ESB gives the State's infrastructure the ability to share and re-use business services throughout AHS.

The Workflow Component offers many potential benefits by creating efficiencies such as abridging claims procedures, simplification of appointments, and improving avenues of communication. The result will be a health care delivery infrastructure that is fast, efficient, and effective. This WF is consistent with MITA initiatives and will focus on improving the business, driving Enterprise Architecture and the implementation of "automated workflows" by:

- Adding business services available to the workflow engine; and
- Adding Business Process Management (BPM) Governance that governs creating, deploying, executing, and managing reasonable business services.

Along with automating certain elements of the workflow, these efforts will allow AHS to use tools to enable and track communications across internal and external entities.

The enterprise Master Person Index and Identity Administration and Management (IAM) solutions are closely coupled and will provide the State with critical software functionality to accomplish the following:

- Identify people in a secure, efficient, and timely manner;
- Track, manage, and audit person records to mitigate duplication of identity records across State systems and databases;
- Identify and link data from disparate systems;
- Assign and manage user privileges once a person is identified and successfully logged-in; and
- Provide authentication, authorization, provisioning, and auditing for the enterprise that meets all necessary compliance regulations for identification management.

The Agency intends to utilize these components to form the building blocks of future technical solutions.

7.3.1 Workflow and Business Process Management

As part of the "Challenges for Change" initiative, the Vermont AHS Workflow, Rules Engine & ESB Team created a high-level business/program process overview (NITA SS-Assessment Methodology, SOA Overview), that was presented in March 2010. The concepts originated in 2008 regional training sessions sponsored by the Center for Medicaid and State Operations (CMSO). The overview started with a basic process diagram model and ended by providing an example of adding a service (Rules Engine) to an SOA-based environment.

This section will leverage that model (along with previously provided Business Architecture process flows), and provide more technical details. The diagram below (Figure 75) is from the presentation. It depicts the final step of adding the Rules Engine service.

The green letters illustrate the steps provided in the overview. The steps are:

A. **Workflow/BPM** – Workflow is the computerized facilitation or automation of a business process, dispatching of work functionality, and management. BPM is the collection of methods and policies (including process design tools) used to manage and provide governance for the business processes.

B. **Services** – As described in previous sections, services are the software modules that map to the business and technical tasks required by the business solution (system).

C. **ESB and SOA Orchestration** – ESB, also described in previous sections of this document, is the group of centralized infrastructure components that, while providing various functionalities, it is a secure message broker. The SOA orchestration provides the event management activities and governance for the reusable services.

D. **Business Rules Engine Service** – Software that executes business rules (i.e., eligibility, rate setting, etc.).

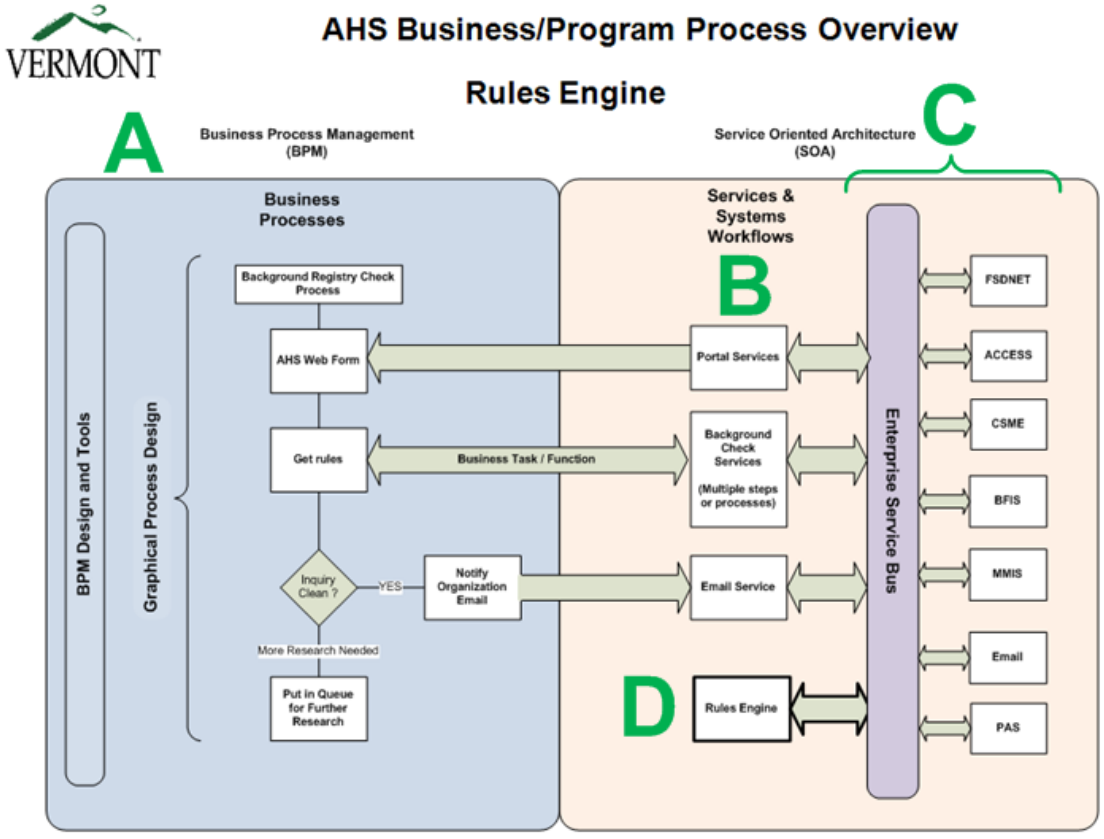


Figure 75: VT AHS Business Process "Workflow" Presentation Slide

Note: This information is from a presentation developed for the Agency's "Challenges

for Change" initiative by representatives from the ESB, Rules Engine, and Work Flow teams.

7.4 Future Technical Architecture

Similar to the other components of the Enterprise Architecture, the Technical Architecture is aligned to the MITA Technical Architecture (TA). Additionally, these sections also contain the impacts or considerations the transition to a SOA environment has upon the State's infrastructure.

7.4.1 MITA Technical Architecture Framework

The MITA Technical Architecture Framework consists of the six components:

- Business Services
- Technical Functions
- Technical Services
- Application Architecture
- Technology Standards
- Solution Sets

These components can be organized into three categories:

- Technical functions:
  - MITA principles, goals, and objectives
  - Business and technical maturity models
  - Technical capability matrix
- Applications architecture (including business and technical services)
- Standards and solution sets

Although the detailed capability information is not complete for each component within the Technical Architecture, the Framework provides a usable structure to categorize and group the system functions necessary to enable and support the business model.

The two main differences between the MITA Business Architecture Framework and the MITA Technical Architecture Framework are:

- The Business Architecture Framework has identified 79 business processes; the Technical Architecture Framework is not currently limited to a specific number of services, but left to the state and their chosen MMIS vendor(s) to determine what is required for their particular environments.

- The Business Architecture Framework has an identified 5 level maturity structure while the Technical Architecture Framework is not tied to the same structure. Earlier MITA Framework releases mapped technical maturity to the five-level business maturity structure, which has subsequently been revised to allow technical services to be based on industry-derived capabilities/maturity levels. Technical functions may now have varied maturity levels which can be based on industry standards for the individual technical functions.

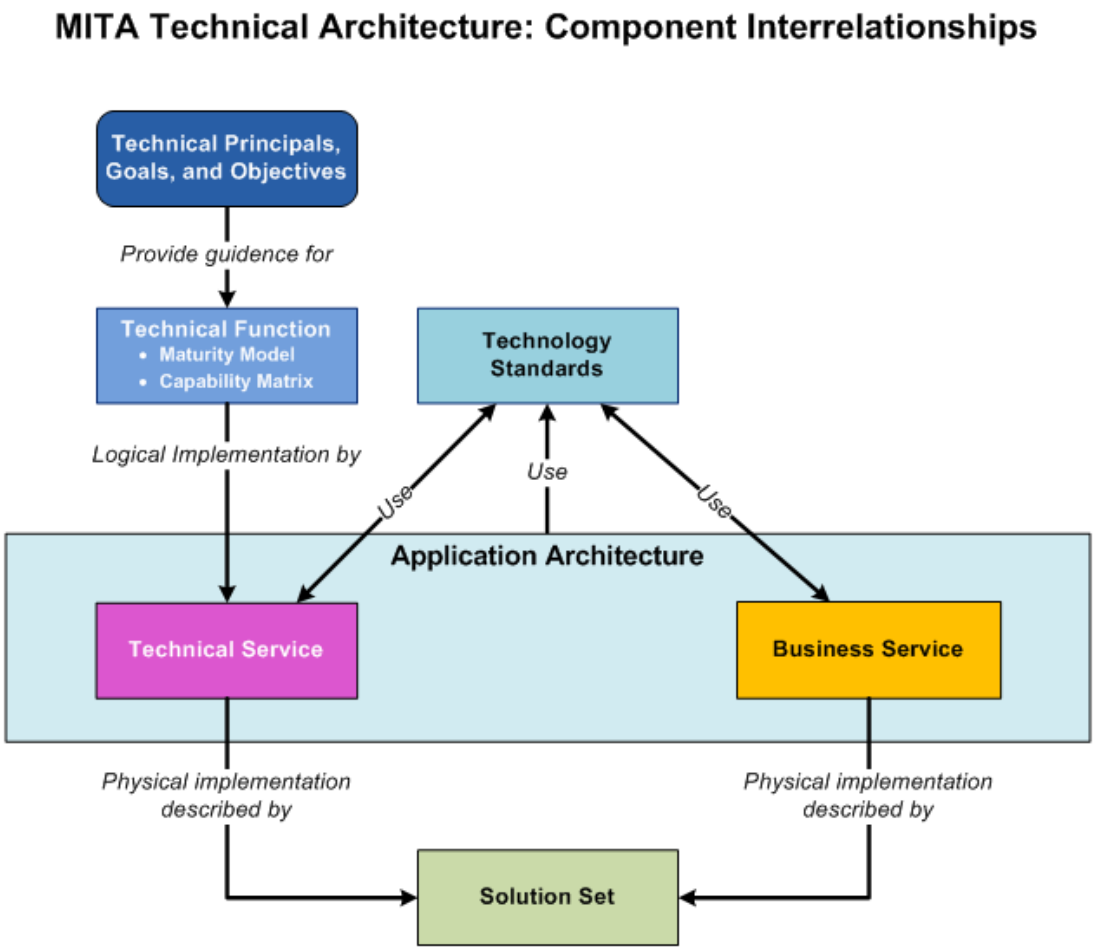


Figure 76: MITA Technical Architecture Component Interrelationships

The MITA TA Unified Modeling Language relationship diagram (Figure 76) illustrates the high-level process involved in creating a technical solution set. The MITA principles, goals, and objectives provide the vision and guidance for the MITA TA. The combination of the other six components/boxes listed above, which make up the MITA TA components, set within the vision of a SOA system, form the blueprint for achieving MITA's objectives. These objectives consist of adopting data and industry standards, providing states and vendors with a common vision and vocabulary for the Medicaid enterprise, promoting reusable components, providing a focus on the beneficiary, and facilitating the efficient, effective, secure sharing of data. The following conceptual

diagram (Figure 77) depicts the future vision of the State MMIS within the guidelines provided by MITA.

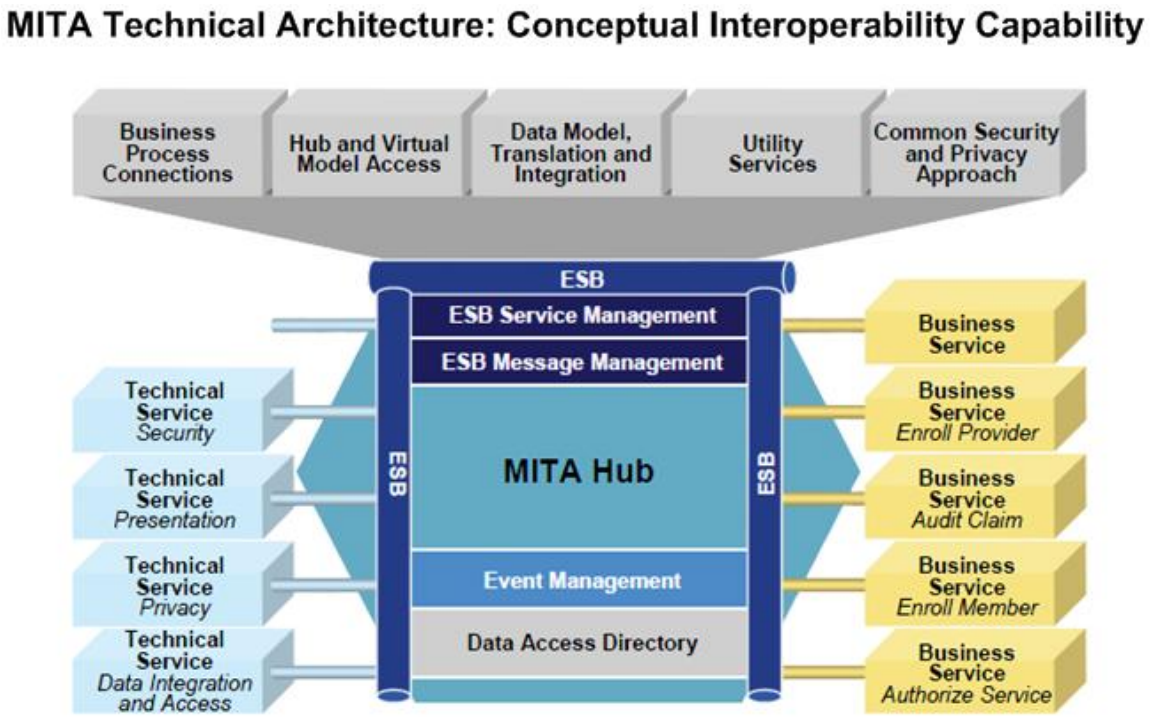


Figure 77: Conceptual Interoperability Capability

The MITA Hub architecture illustrated above, using various ESB functions, is the most mature means of transmitting and receiving services and information over an interoperability channel. It offers security and privacy control points, and the ability to locate utility services within the hub. Once the request is at the hub, the interoperable services may need to access information and services through virtual access, which makes the architecture expandable.

The six components of the MITA TA are briefly described in the following subsections.

7.4.2 Technical Functions

Technical functions take the Business Capability Matrix (BCM); MITA principles, goals, and objectives; and technical functions, which are used populate a grid demonstrating how each area can evolve. In some cases, the technical area will be replaced by a new technical area.

Each technical function provides the technologies for one or more of the following:

- Enabling one or more business capabilities (e.g., forms management and workflow for automating provider enrollment) technical functions only exist to enable the business processes.

- Realizing one or more MITA goals or objectives (e.g., the goal "promote reusable components — modularity") is enabled by the technical capabilities that are part of SOA such as the utilization of the ESB.
- Enabling the transition of a legacy system or process to MITA.

MITA encompasses two different maturity models. The Business Process maturity model is a macro-level framework that is very linear. The technical functions maturity model has evolved to reflect more micro-level flexibility that capture multiple levels of maturity based on industry standards and the way technical functions support business functions.

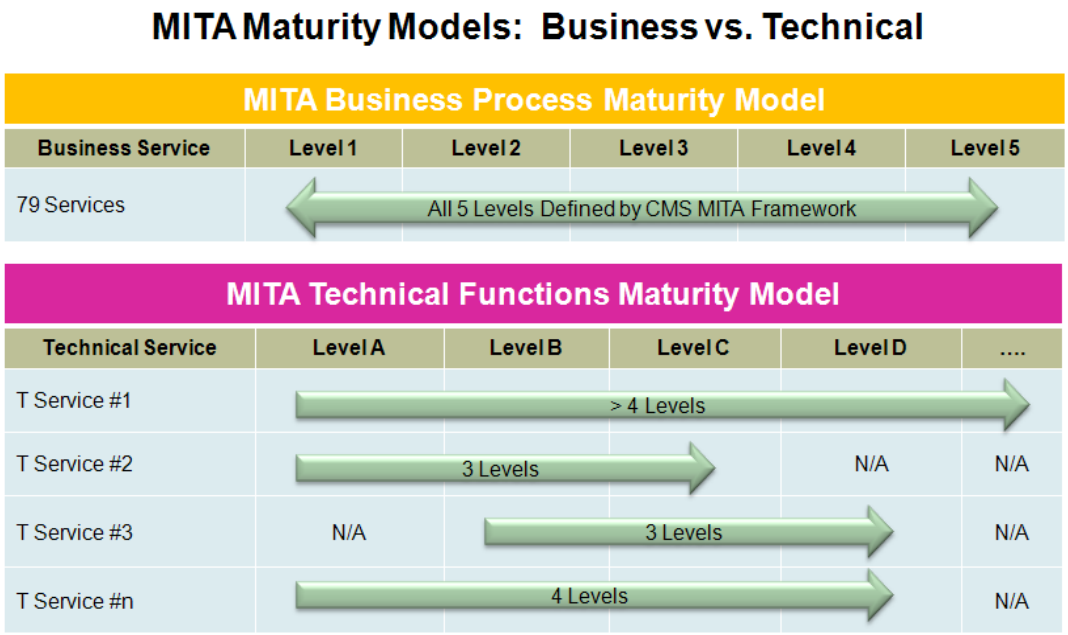


Figure 78: Technical Maturity Model vs. Business Area Maturity Model

As indicated in Figure 78, the MITA technical function maturity levels do not necessarily align with the MITA business process maturity levels. The scale has recently changed to better illustrate that difference. The benefits of this change are as follows:

- The technical function may have one or many levels of maturity based on the industry standards for that particular technical function. This allows a technical service to be based on the industry derived capabilities/maturity levels.
- Solution sets for business services can make use of a heterogeneous mix of technical maturity levels based on the value that they bring to the business process.

As part of the technical functions area, a Technical Capabilities Matrix (TCM) is created. The technical capability results from applying the MITA Technical Function Maturity Model, Business Capability Matrix, and the technical principles, goals, and objectives to the individual technical functions. The TCM defines how a technical function will change as it matures over a designated period of years. The technical capability is measurable and provides descriptions of the function as it matures from one level to the next. The

TCM allows states to determine the current level of maturity of a technical function and to chart a course for improving or transforming their maturity level in the future.

Other general information pertaining to the CMS MITA technical functions is as follows:

- Interfaces to technical functions are modeled as triggers and results (just like business processes);
- Technical function maturity level pairs (function + capability) will result in a technical service;
- Technical functions will be defined using the TCM template but modeled using Unified Modeling Language or Business Process Modeling Notation (BPMN) for established standards going forward; and
- The technical functions are currently being defined by the Private Sector Technology Group's Technical Architecture Committee (TAC).

7.4.3 Technical Standards

Technical standards are a set of standards that relate specifically to technology that represents MITA recommendations for state implementations. This will allow the State's implementations to be compliant with industry standards and to enable interoperability of the Medicaid enterprise.

The Agency currently adheres to numerous technology standards; the majority of the existing standards deal with adhering to local, State, and federal requirements. The following table contains a sampling of the technical standards currently implemented across the Agency.

Existing AHS Standards	Links
45 CFR 95.623	http://edocket.access.gpo.gov/cfr_2006/octqtr/pdf/45cfr95.624.pdf
Centers for Medicare & Medicaid Services Information Security	http://www.cms.gov/InformationSecurity
HIPAA Privacy and Security Rules (AHS is a covered entity) Privacy Rule	http://www.hhs.gov/ocr/hipaa/finalreg.html
Internal Revenue Service (IRS) 1075	http://www.irs.gov/pub/irs-pdf/p1075.pdf
Medicaid Information Technology Architecture	http://www.cms.gov/MedicaidInfoTechArch/04_MITAFramework.asp
National Institute of Standards and Technology (NIST) Special Publications (800 Series)	http://csrc.nist.gov/publications/PubsSPs.html
National Institute of Standards and Technology FIPS Series (referenced by the 800 Series)	http://csrc.nist.gov/publications/PubsFIPS.html
Centers for Medicare & Medicaid Services Security Rule	http://www.cms.hhs.gov/SecurityStandard/Downloads/securityfinalrule.pdf

Existing AHS Standards	Links
State of Vermont Statute (SSN)	http://www.leg.state.vt.us/statutes/fullsection.cfm?Title=09&Chapter=062&Section=02440

Table 41: AHS Technical Standards

The transition to a health care enterprise based upon SOA concepts and principles will enable change across the Agency. However, it is critical for the Agency to adopt and adhere to standards throughout this process in order to establish a common methodology and approach for future enhancements. These standards will provide guidance in all facets of the Enterprise Architecture, from governance and initiation of modifications to the specifications for the design, development, and implementation of enhancements.

Rather than list each and every standard that provides SOA guidance, the table below provides information on the key standard-setting bodies developing this direction. This information is provided as an example of the types of strategies the Agency will implement to manage change in any one of the three components of its architecture (i.e. Business, Information, or Technical).

Technical Standard Groups	Links
National Health Information Network (NHIN)	http://www.hhs.gov/healthit/healthnetwork/background/
Open Applications Group (OAG)	Open Applications Group Integration Specification (OAGIS) Standard http://www.oagi.org/dnn2/
The Open Group	The Open Group Architecture Framework (TOGAF) http://www.opengroup.org/togaf/
World Wide Web Consortium	http://www.w3.org/standards/

Table 42: Key Standards

Please note, additional standards pertaining to the Information Architecture such as Health Level 7 (HL7) and the National Information Exchange Model (NIEM) are presented in the Information Architecture Analysis section of this document (Section 6).

7.4.4 Business Services

Business services logically define a service that provides Medicaid functionality based on MITA business processes and business capabilities. The desired business functionality for a particular business process will drive the technology options available for improvement. Business and technical service definition methods are as follows:

- Interfaces are defined in Web Service Definition Language (WSDL)
- Messages are defined in XML schemas
- Business Logic – currently free-form text, will become business rules in the future

- Business Service Management (orchestration) is defined in Business Process Execution Language (BPEL)
- Data is defined in MITA logical data model

7.4.5 Technical Services

Technical services logically define a service that provides technical functionality that enables the MITA business services to operate successfully at the level of non-Medicaid-specific functionality and can be thought of as system, utility, or common services. In other words, a technical service can be an enabler that supports the business process, or a technology that promotes MITA goals and objectives (i.e., flexibility, adaptability, and interoperability). A technical service can be defined for each technical function—maturity level pair.

The current methodology used to define CMS MITA technical services is the same as for business services such as The Open Group Architecture Framework, Health Level Seven International, National Information Exchange Model, etc. The HL7 Reference Information Model is being used in the development of the technical service interfaces where possible.

Similar to the MITA business processes, the MITA technical functions use capabilities to define the services' technical logic and service contract as depicted in the following diagram (Figure 79). Service contracts document the rules and procedures used to activate a service. These service contracts can be used by an ESB and Service Management Engine to activate a service and to route responses from the service. A services interface is derived from the technical triggers and responses, and is described using Web Service Definition Language.

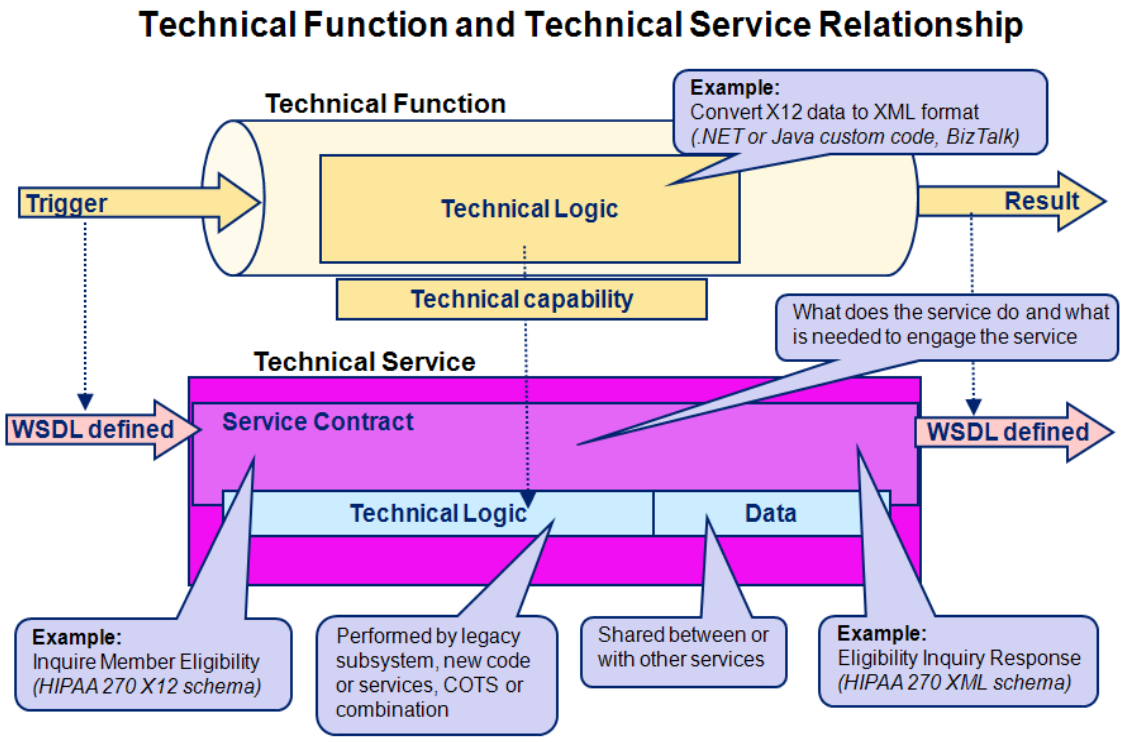


Figure 79: Technical Function and Technical Service Relationship

States have significant flexibility when it comes to modifying technical services. Similar to business services, technical services can be manipulated in the following manner:

- **Change Message Structure** – Schema change
- **Change data being used** – Change data set name
- **Replace capability** – Replace service with industry standard solutions and\or State department standards.

7.4.6 Application Architecture

The Application Architecture defines the environment in which the services will be operating. The Application Architecture also provides the infrastructure for orchestrating the flow of information between the appropriate technical and application processes.

The following diagram (Figure 80) provides a conceptual overview of the new MES. A complete future application architecture will be developed by the new MES vendor selected as a result of the Vermont MES procurement.

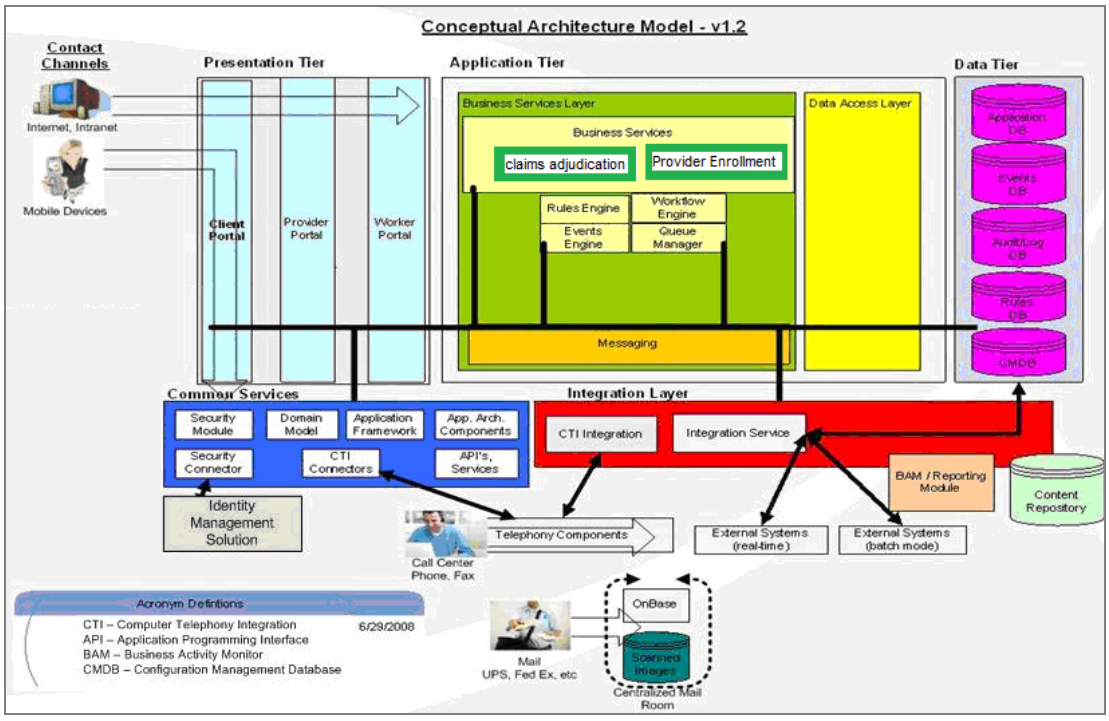


Figure 80: Conceptual Application Architecture of New MES

7.4.7 Solution Sets

Solution Sets provide a resource for states to determine the reusability of MITA services (business and technical) and infrastructure components. A solution set contains the metadata describing a specific implementation approach (Figure 81).

Varied Technical Maturity Levels for a Business Solution Set

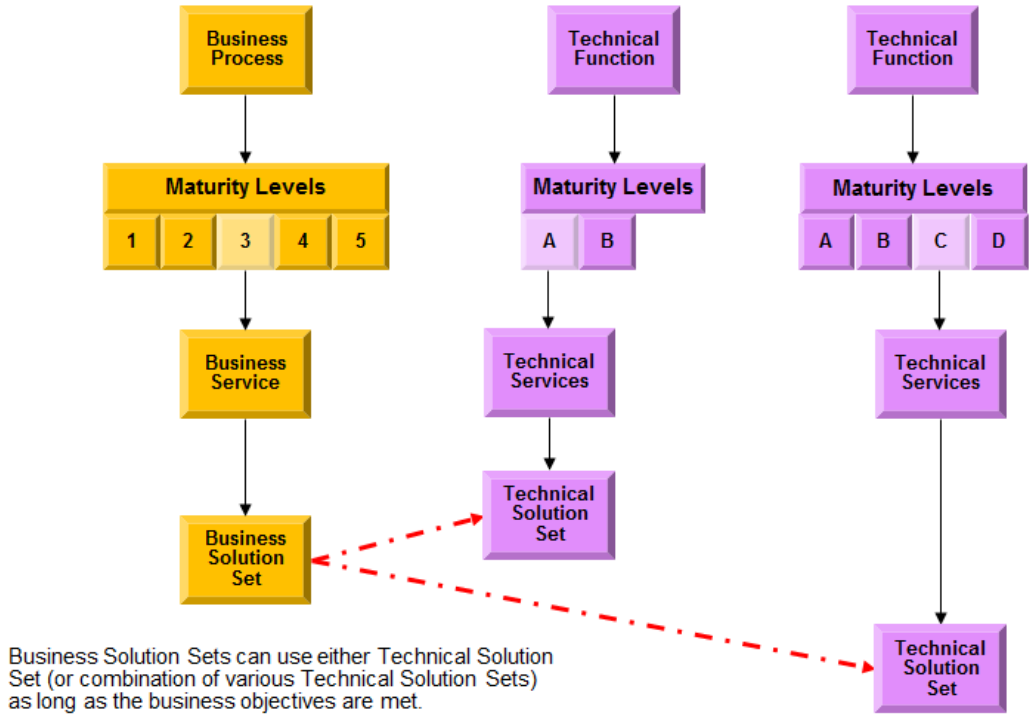


Figure 81: Business Solution Set Options

7.4.8 Technical Capabilities Matrix Breakdown

The MITA Technical Capabilities are grouped into categories and subcategories (see Table 43). The top-level categories are listed in the table. Representative (sample) technical services for those areas are provided in the following subsections.

Technical Capability Categories	Sample Technical Service
MITA Business-Enabling Services	• Workflow Management • Business Process Management • Decision Support: Data Mining
MITA Access Channels	• Portal Access • Support for Access Devices
MITA Interoperability Channels	• SOA: Enterprise Service Bus • SOA: Orchestration and Composition • Integration of Legacy Systems
MITA Data Management and Data Sharing	• Adoption of Data Standards
MITA Performance Measurement	• Performance Data Collection
MITA Security and Privacy	• Authentication • Authorization and Access Control • Logging and Auditing

Technical Capability Categories	Sample Technical Service
Flexibility - Adaptability and Extensibility	• Rules-Driven Processing

Table 43: MITA TCM Matrix Sample Technical Service Listing

A brief description of the sample technical service and a diagram illustrating the triggers and results of the particular service are shown below.

MITA Business Enabling Services

The Business Enabling Services technical area promotes the dissemination of information and consistent workflow throughout the system in an efficient manner. This technical area can be broken down into six sub-technical areas including Forms Management, Workflow Management, Business Process Management, Business Relationship Management, Foreign Language Support, and Decision Support. The latter sub-technical area, DS, can be broken down into six further sub-technical areas as illustrated in Table 44.

Business Enabling Services - Technical Areas
1. Forms Management
2. Workflow Management
3. Business Process Management
4. Business Relationship Management
5. Foreign Language Support
6. Decision Support
→ DS: Data Warehouse
→ DS: Data Marts
→ DS: Ad Hoc Reporting
→ DS: Data Mining
→ DS: Statistical Analysis
→ DS: Neural Network Tools

Table 44: MITA Business Enabling Services

The sample Program Integrity Management – Identify Candidate Case business process high-level flow diagram (Figure 82) illustrates the MITA Business-Enabling Services, but does not show all technical areas and sub-areas. The two primary technical services depicted are:

- **Workflow Management (A)** – Given the need to provide the enabling functionally for the technical services, the focus of the workflow management components is on the processes to plan and control the schedule of events. Workflow software products do not create business processes.

- **Business Process Management (B)** – A business process can be defined as a set of interrelated tasks linked to an activity that spans functional boundaries. There are starting and ending points that create repeatable processes. The relationship of business processes and workflow solutions must be declared.

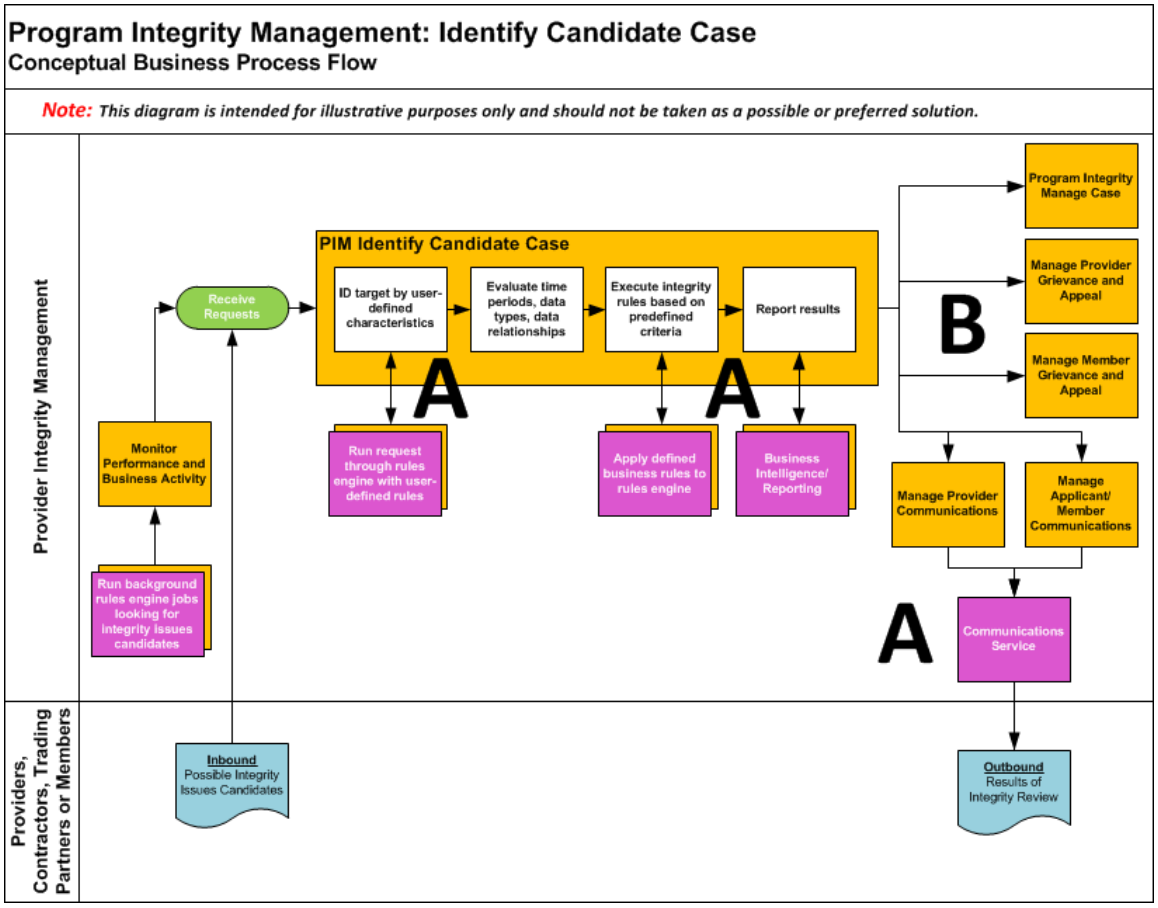


Figure 82: Process Flow Illustrating Workflow Management

The workflow components typically include input descriptions, transformation rules and algorithms, and output descriptions. The example for Program Integrity Management involves a series of technical services and possible human intervention to allow for a successful business process. The system processes, for example Web services, generally involve additional descriptors like quality of service and availability since those types of information are desired.

The following diagram (Figure 83) illustrates the possible enabling technical services listed above and how they may be implemented as components of an SOA. Additional orchestration capabilities that are a big part of the workflow and business processing key functions are included in the interoperability channels section.

The diagram also incorporates the **Decision Support/Data Mining (C)** technical service. The need for data gathering in a manner to assist in particular decisions is increasingly

growing in popularity. Data mining is based on patterns of data which aid in profiling of members and providers. Data mining functionality provides needed information when massive amounts of data exist. The services are typically custom designed for particular requirements.

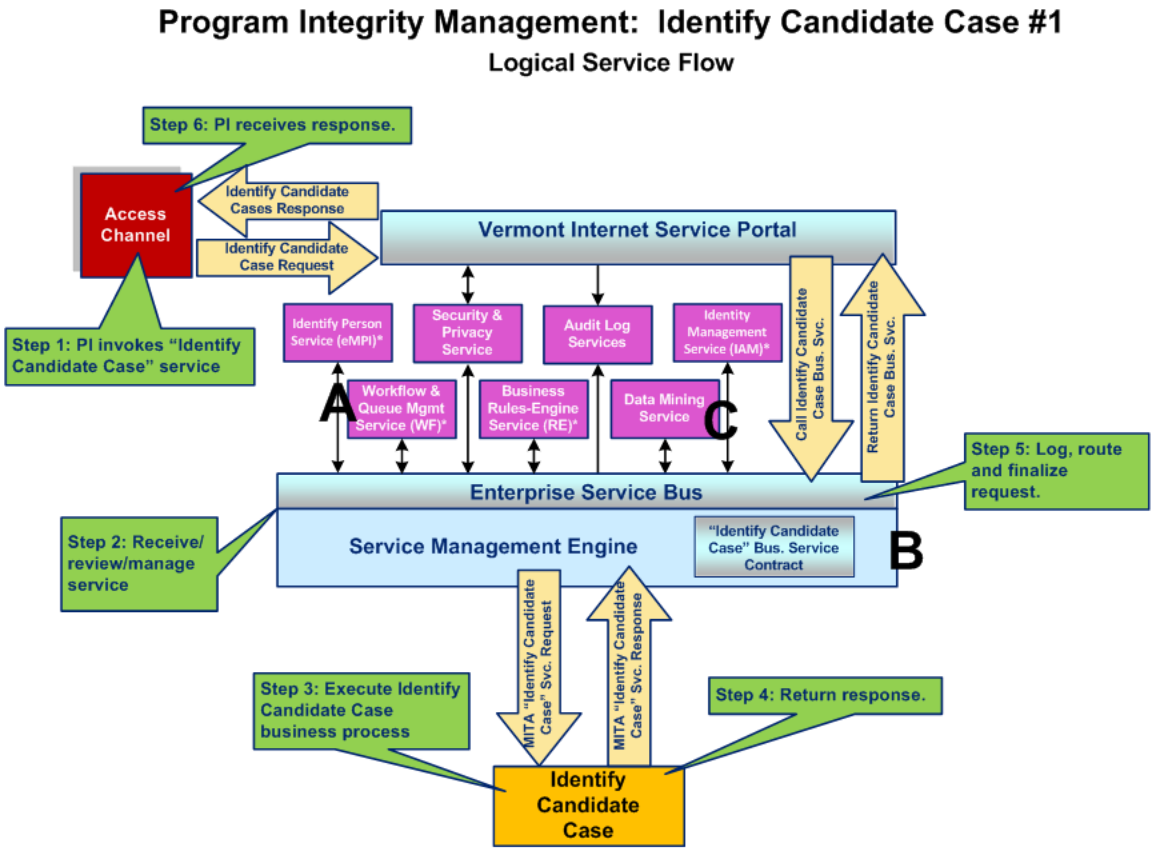


Figure 83: Data Mining Illustration

As indicated by the numerous business-enabling services shown in the figure above, different offerings in the industry provide varied capabilities. Therefore, it is important to define strategies, goals, and standards for the various enabling areas implemented to support the enterprise.

MITA Access Channels

The Access Channels technical area addresses the manner in which a system handles the user's ability to access the system. Accessibility, according to MITA, is defined as person-to-system access. The greater the accessibility to the system, the more aligned that system will be with the MITA Framework. This technical area can be broken down into two sub-technical areas:

- **Portal Access** – Methods by which a person can access a system range from a protocol specific to one type of device/technology to input device transparency.
- **Support for Access Devices** – Various protocols and methods that are supported for portal access from one or more devices/technology. Adapters can be made accessible for use via a registry service.

A MITA solution will allow a stakeholder to inquire on Medicaid eligibility using a variety of access channels. Access channels are integrated with security and privacy services to provide role-based access to the system resources that each user is authorized to access. Stakeholders in the future will likely desire various new methods of interacting with state Medicaid systems. For example, in the future, it may be desirable to send stakeholders secure email notifications. A MITA solution would allow new access channels to be added while leveraging the existing services.

The sample Inquire Member Eligibility business process high-level orchestration is illustrated in Figure 84, and depicts the two primary technical services listed above: **Portal Access (A)** and **Support for Access Devices (B)**.

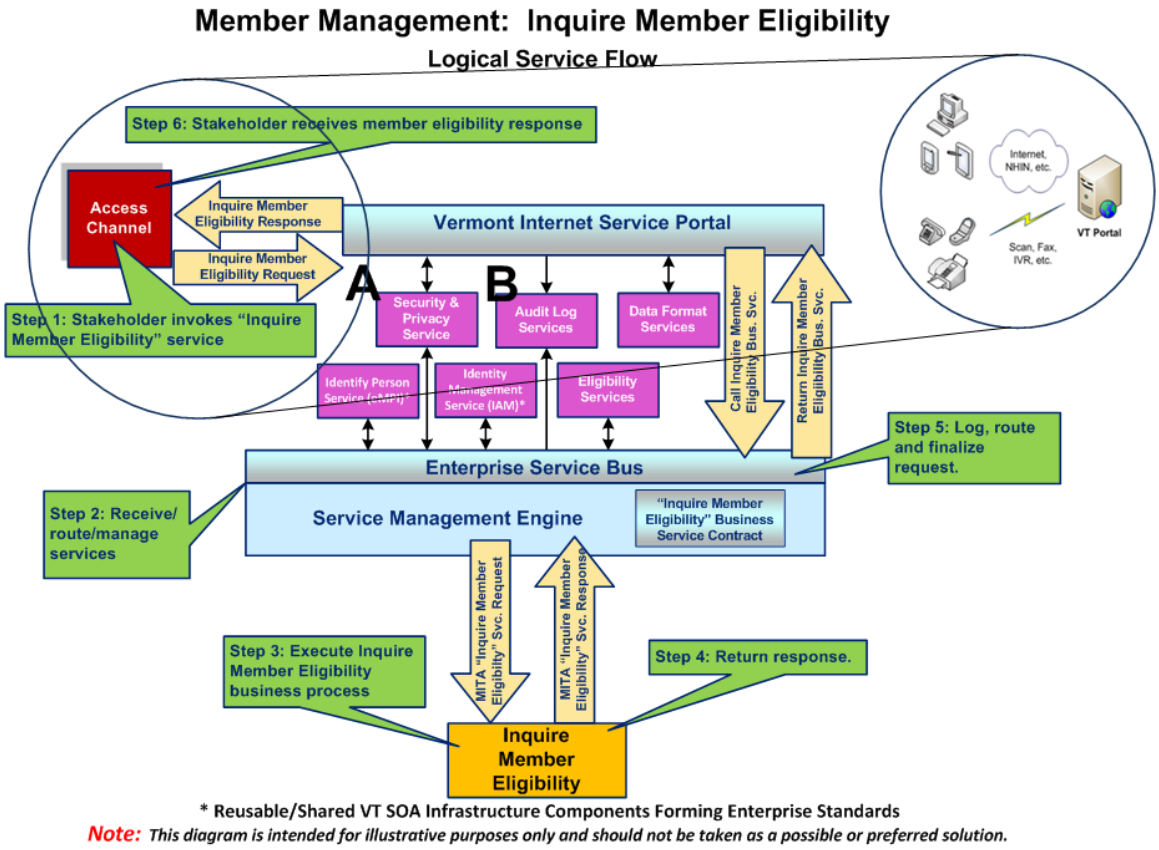


Figure 84: Example Access Channel Opportunities

Figure 84 also illustrates various access channel options that are available today.

To introduce device-transparent portal access functionality into the orchestrated business flow, a technical access channel service is introduced within the orchestrated process set. This access channel would receive Member Services IME Requests to the Vermont Internet Service Portal, and respond with Inquire Member Eligibility Responses.

Refer to Figure 85, for an illustration.

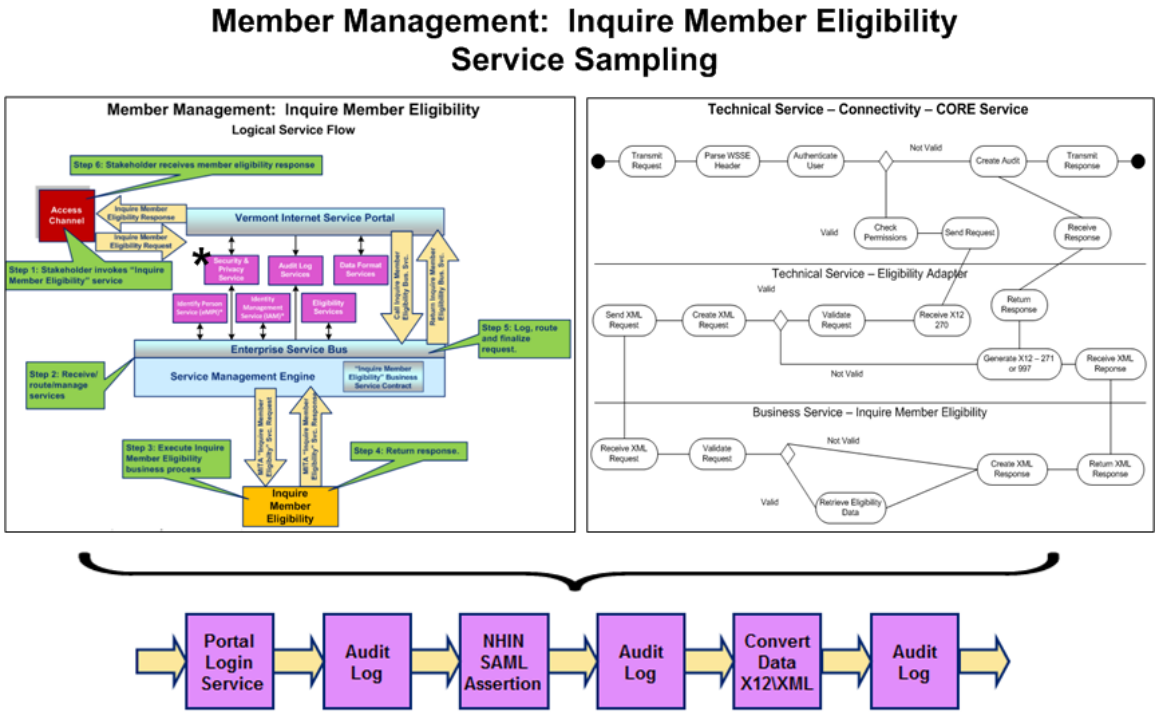


Figure 85: Access Channel – Inquire Member Eligibility Request/Response

The asterisk (*) indicates the access channel enhanced encryption service which is part of a National Health Information Network service connection. For example, the NHIN CONNECT Gateway solution could allow a means for authorized providers to access the State services available via the existing connections capabilities.

MITA Interoperability

The Interoperability technical area promotes organized and efficient system to system communication. The more interoperable a system becomes the more agile and responsive it becomes to system changes. This technical area is also important in ensuring the system becomes technology neutral.

Overall, the goal of obtaining interoperability is to have an architecture where diverse systems can work together. This area can be broken down into 3 sub-technical areas: Service-Oriented Architecture, Standards-Based Data Exchange, and Integration of

Legacy Systems. The Service-Oriented Architecture can be broken down further into three sub-technical areas as illustrated in Table 45.

MITA Interoperability - Technical Areas
1. Service-Oriented Architecture
→ SOA: Service Structuring and Invocation
→ SOA: Enterprise Service Bus
→ SOA: Orchestration and Composition
2. Standards-Based Data Exchange
3. Integration of Legacy Systems

Table 45: MITA Interoperability

The SOA items listed are explained in both the evolving Technical Architecture section as well as Appendix A, which presents MITA/SOA Reference Information.

MITA Data Management and Sharing

According to the MITA Framework, the Data Management and Sharing technical area provides a structure that facilitates the development of data that can be effectively shared across a state's Medicaid enterprise boundaries to improve mission performance. It also provides an impetus for state Medicaid agencies to better understand their data and how it fits in the total realm of Medicaid information. The DMS addresses fundamental areas necessary to enable information sharing opportunities and to position state Medicaid agencies to operate in an environment of global information:

- **Adoption of Data Standards** – Standardized data definitions and data-sharing schemas are used to exchange data. The Medicaid industry standards of interfacing using EDI and other data sets need to be handled via one or various technical services since the MITA Framework is based on XML business interactions.
- **Data Exchange Across Multiple Organizations** – Methods by which an enterprise can participate in an information-sharing community range from a single point to point interface to participation in a brokered information exchange. The established ESB will provide a valuable option to allow near real-time data sharing with other VT AHS applications and nearby organizations.

The sample Inquire Member Eligibility business process high-level orchestration is illustrated in Figure 86. For illustration purposes, the **Adoption of Data Standards (A)** technical service is depicted.

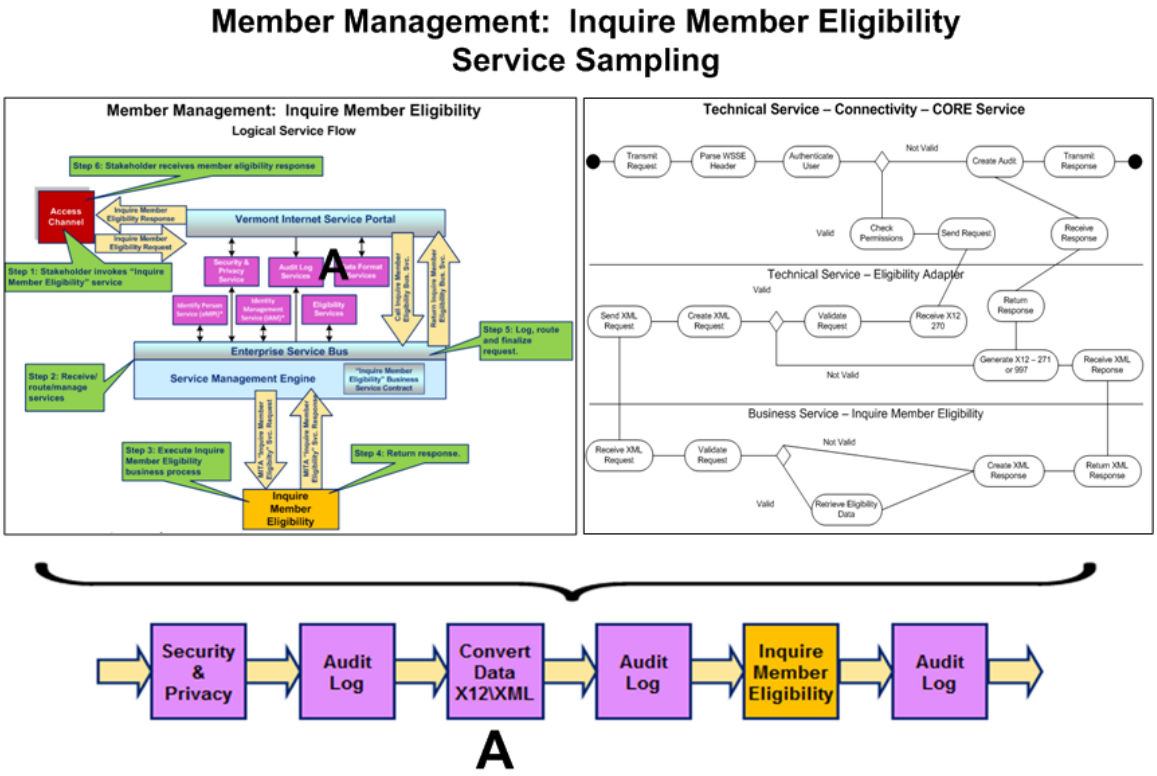


Figure 86: Inquire Member Eligibility Logical Service Flow

A MITA solution will allow an enterprise to exchange data with other enterprises using standard MITA schemas and data definitions. These data standards provide a common format and glossary for all data-sharing organizations. Each enterprise is responsible for mapping from their internal data to conform to the standard data definitions and schemas. Future additions to the enterprise data model should take the external standards into consideration. Matching the standards would simplify mapping and provide for a data dictionary that more closely matches the external standard. Also, abstracting all data formatting functions will enable an enterprise to respond to changes in the standard schemas in the future.

To introduce data exchange functionality into the orchestrated business flow, a Technical "data format" Service (labeled "Convert Data X12\XML" in the example above) is part of the orchestrated application solution set. This service will transform enterprise data to and from the standard formats. All mappings should be rule-based whenever possible to simplify modifications required to conform to any future changes in the standard schemas.

MITA Performance Measurement

The Performance Measurement technical area tracks performance and alerts stakeholders for any activity which falls outside acceptable criteria. A common transformation approach has yet to be defined in the MITA Framework. As of today, this technical area will perform system and program monitoring which keeps management informed on the

status of the overall Medicaid System. This technical area can be broken down into two sub-technical areas: Performance Data Collection and Reporting and Dashboard Generation.

The two most common terms encountered when dealing with performance measurements are Business Intelligence (BI) and Business Activity Monitoring (BAM). BI is generally referred to as a framework, whereas BAM is a BI technology option.

The simplest result of this technical area involves reporting on general usage and performance metrics. These abilities can be achieved in a variety of ways including hard coding listeners or junctions in developed code to save basic day-to-day business operations volumes. The distribution of these findings can be handled in a variety of ways including email, dashboard, review board, etc. If the intention is to be able to evaluate in real-time critical performance indicators, the BI approach could be the solution of choice. Several companies have BI and BAM products, but they tend to be quite costly.

If BAM technologies are to be implemented, three areas of preparation to maximize return on investment are recommended. They are:

- Identification of expected business benefit(s)
- Integration with existing or expected BI and enterprise integration solutions
- Business practices (processes) will need to change and business users must be trained

Dashboards can be developed through the implementation of BAM and BI technologies. The technologies required in order to communicate to dashboard indicators are varied and rudimentary for the most part. Normal enterprise standards should be adhered to in order to satisfy this requirement.

MITA Security and Privacy

The Security and Privacy technical area promotes standards that will provide a level of consistency focused on the tactical sharing of data. Security and Privacy standards will address policies, management procedures, and technical services that cover technical functions (e.g., authentication, authorization, and auditing) and ensure that security policies are enforced between MITA services. This area can be broken down into six sub-technical areas (Table 46).

MITA Security and Privacy - Technical Areas
1. Authentication
2. Authentication Devices
3. Authorization and Access Control
4. Intrusion Detection
5. Logging and Auditing
6. Privacy

Table 46: MITA Security and Privacy

Authentication and audit log services will be used as examples of technical services and their usage in the MITA-based orchestration of the Inquire Member Eligibility business process. A sample Inquire Member Eligibility business process high-level orchestration is illustrated in Figure 87. The example has been modeled using the UML and BPMN standards. Two technical service areas are depicted:

- **Security & Privacy (A)** – Secure authentication methods and techniques range from ID\Password to SAML (Organization for the Advancement of Structured Information Standards - OASIS - standard) assertions.
- **Audit Log (B)** – Various logging standards which can include security and audit needs are available for usage.

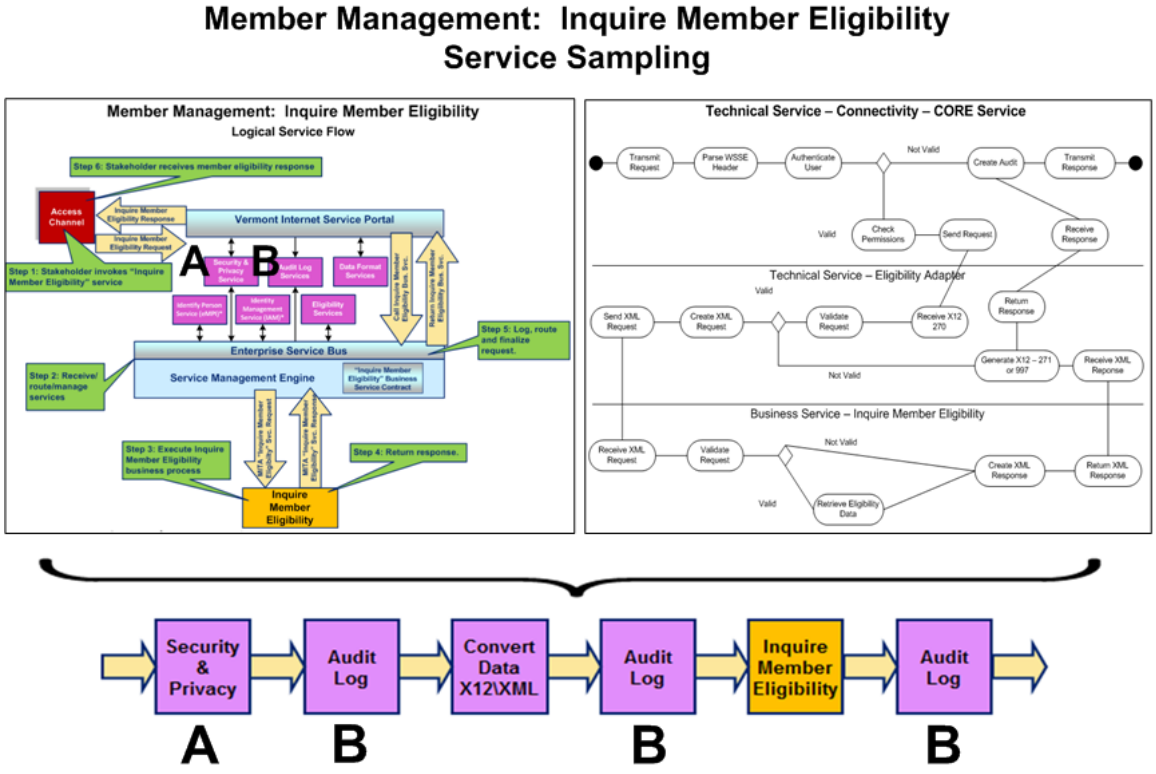


Figure 87: Sample IME Service Orchestration

A MITA solution to allow a provider or member to inquire about Medicaid eligibility without calling a helpdesk might involve an Internet facing portal using a combination of technical services to communicate to a MITA-based Inquire Member Eligibility business service as shown in the example diagram.

To introduce authorization and access control functionality into the orchestrated business flow, a **Rules Engine (C)** technical service is inserted into the orchestrated process set. Given the "plug and play" nature of the SOA-based MITA Framework, the rules engine service can be inserted into the flow to increase the overall technical capability of the application solution set. The rules/policy engine capability provides a level of authorization to actively use the Inquire Member Eligibility business service. Figure 88

illustrates this flow with an additional technical area.

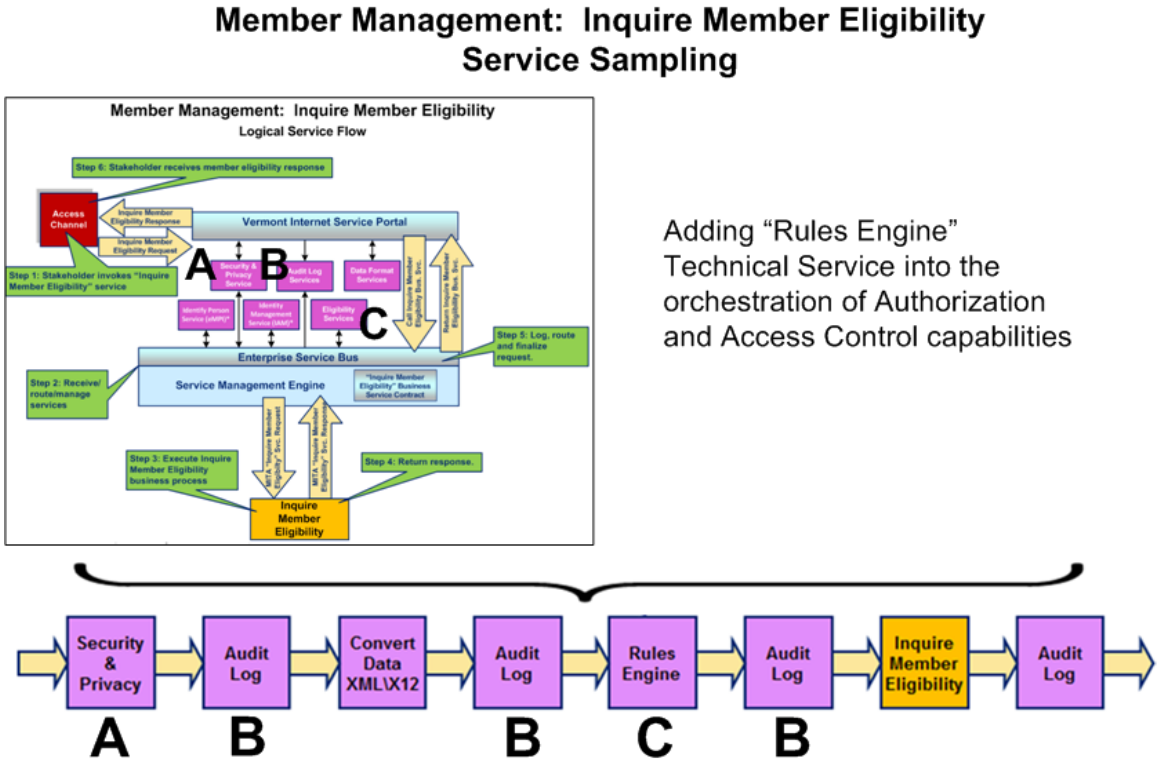


Figure 88: Rules Engine Technical Service Added to Orchestration for Authorization

A sample Technical Capability Matrix is provided in Figure 89 to illustrate how the breakdown of technical capabilities can be documented to determine current and future levels of functionality desired.

CMS MITA Technical Capability Matrix (TCM)

Technical Function: Security and Privacy				
Level A	Level B	Level C	Level D	.....
Technical Function: Audit Logging				
Manual logging and analysis	Access to the history of a user's activities and other management functions, including logon approvals and disapprovals and log search and playback.			
Technical Function: Authentication				
Access to MMIS system capabilities via logon ID and password		User authentication using public key infrastructure in conformance with MITA-identified standards.		
Technical Function: Authorization and Access Control				
		User access to system resources depending on their role at sign-in.		

Figure 89: Partial TCM Example for Security and Privacy Technical Functions

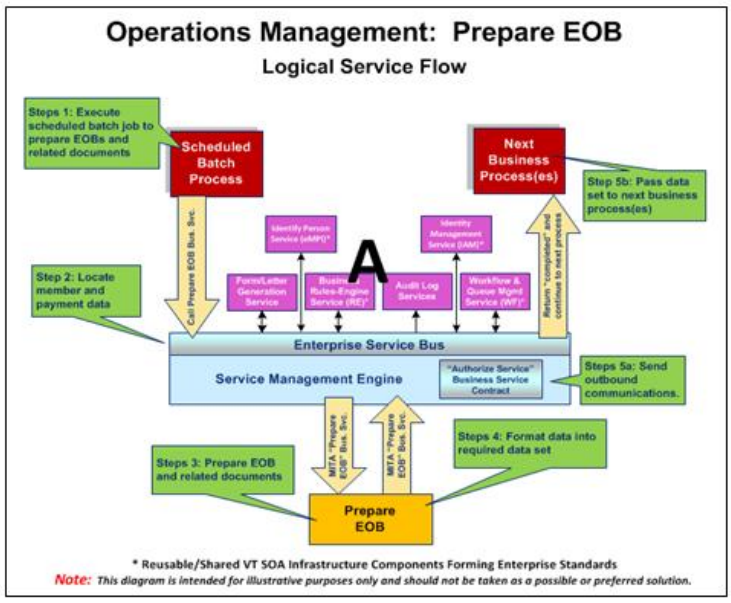
Flexibility – Adaptability and Extensibility

The Flexibility – Adaptability and Extensibility technical area promotes an environment that supports flexibility, adaptability, and rapid response to changes in programs and technology in Vermont, fulfilling one of the major goals of the MITA Framework. Adaptability and extensibility also promote modularity, component reuse, interoperability, and integration using open architecture. This technical service area can be broken down into four sub-areas:

- **Rules–Driven Processing** – System design methods allow software to process data based on values stored in the configuration, as opposed to being hard-coded.
- **Extensibility** – System design methods which allow new functionality to be added without changing existing functionality or infrastructure. Methods range from simple reusable, modular code to a robust and reusable base class library.
- **Automate Configuration and Reconfiguration Services** – Methods which allow configuration changes to be automatically deployed for new environment or modified for existing environments. Methods range from 'default' configurations to feature-rich configuration wizards.
- **Introduction of New Technology** – System design methods which allow new technology to be added without major infrastructure changes.

The sample Operations Management - Prepare EOB business process high-level orchestration is illustrated in Figure 90. For illustration purposes, the primary technical service depicted is **Rules-Driven Processing (A)**.

Prepare EOB – Service Sampling



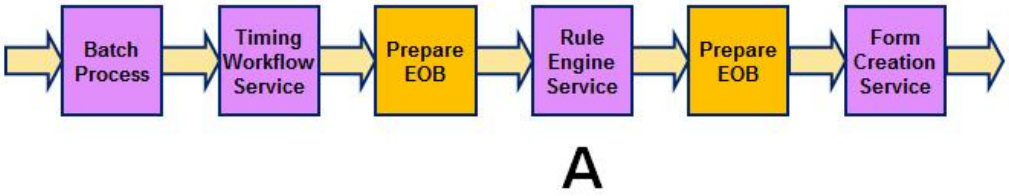


Figure 90: Prepare EOB Service Sampling

A MITA solution will allow an enterprise to make system changes with minimal impact to existing functions and at a reduced cost and effort. Rules-driven processing would allow for processing to meet any future requirements without major changes to the system. In other words, a rules-based processing environment provides an agile platform that can be modified and archived as policy decisions are made. An extensible system can leverage existing code through common code and code reuse. New functionality need not impact existing functionality. MITA flexibility will make the organization more responsive to changing needs in all other areas of the system, and take advantage of emerging technologies.

7.4.9 Future Infrastructure

In order to realize the State's desire to modernize its technology platform for Medicaid operations, the new MMIS system must bring robust, scalable, reusable, and modular capabilities that can only be seen in a SOA/ESB platform. The MITA Framework provides the core component roadmap and requirements necessary to achieve the maximum benefits of this future platform.

With an ESB suite of products and services, the State can experience near "real-time" data integration and advanced composite application capabilities regardless of where the physical or virtual platforms exist. For example, the State can handle data sharing with disparate systems for patients, caregivers, payers, labs, hospitals, etc. in real-time "broker message services" rather than "batch processes" that occur once a day or predefined periods of time.

It is imperative to understand that not all SOA/ESB components provide the same capabilities regarding business services. To this end, the SOA Infrastructure RFP will request information on at least four key capabilities: adapters, data transformation, orchestration, and communication. By combining these capabilities, the State can automate "publish" and "push" services, even with existing legacy systems.

The future desktop platform should be based on industry open standards. Typical hardware can be any WinTel environment with the latest Web browser so long as it is adhering to the enterprise standards, such as Internet Explorer 8 or greater. Other characteristic will be important to collate existing workstation/desktop information including metrics such as CPU, RAM, HDD, and monitor type/size.

The future state hardware platform may include existing assets that are repurposed as long as these requirements are observed. While MITA does not determine specific hardware type, the objective is to define the layers where the new MES system will be hosted. It is important to note that the physical platform is not independent of the MES application platform as they are necessarily, tightly integrated. Therefore, the basis of design for physical platform gets general direction from the application infrastructure, with common elements of performance, security, capacity, scalability, and high availability.

Section 8 – Appendices & Additional Information

The material contained in this section has been provided to supplement the information presented in the body of the Agency Medicaid Enterprise Architecture Analysis. This additional material includes general information about MITA and SOA, a sample data flow model, and a matrix identifying the MTA business process samples presented throughout the document.

8.1 Appendix A – MITA/SOA Reference Information

The following sections contain general information related to MITA and SOA. This information is a starting point for discussions regarding SOA and SOA Governance. These concepts will be further refined and implemented by the Agency as their Enterprise Architecture continues to evolve.

8.1.1 MITA Framework and the Medicaid Enterprise

Over the years, the rules and regulations involved in administering a Medicaid program have become increasingly complex. This is especially true in the State of Vermont, where the State Legislature has implemented many innovative ideas to broaden the coverage available to all Vermonters. Unfortunately, the existing Medicaid Management Information Systems in most states are not able to easily accommodate the changes necessary to support this rapidly changing environment.

Generally, an existing MMIS is a legacy mainframe-based application facing the following challenges:

- Highly interconnected systems using point-to-point interfaces require pervasive modifications to accommodate changes to business requirements, making them difficult to change
- Users must navigate through multiple functional systems to perform a single task
- MMIS, to a large extent, has been platform-dependent, and does not communicate easily across functional or technical boundaries, which makes it difficult to share information or reuse functionality

CMS created MITA to assist states in addressing the challenges listed above. MITA is not a system implementation methodology or process; rather, it is a flexible and adaptable structure with which an MMIS project can plan, execute, and integrate business change. In other words, the MITA Framework provides a common systems architecture foundation that enables states to advance their Medicaid systems by implementing current trends in technologies. Given the numerous linkages of the common MMIS system, the MITA Framework was based on guiding concepts to be able to adapt to changes with near information exchange entities (i.e., other agency systems, CMS, providers, etc.) as well as being cognizant of the exchange needs with other state and federal entities (i.e., ONC, FHA, etc.). The following diagram Figure 91 illustrates the MITA Medicaid Enterprise – Sphere of Influence, which conceptually shows MITA linkages to other federal and state organizations.

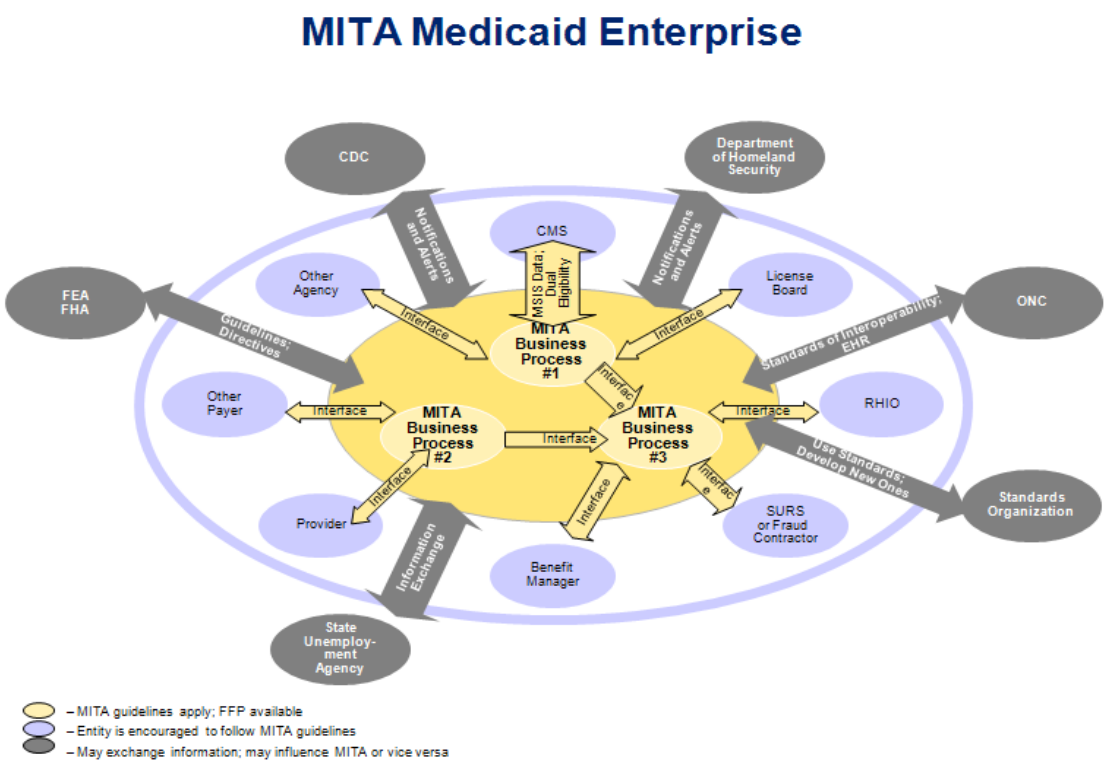


Figure 91: MITA Medicaid Enterprise – Sphere of Influence

In order to facilitate the point-to-point interfaces, end-user navigational issues, and the difficulties of sharing information, as well as the reuse of common functions within the agency, the primary MITA principle is to establish a "services" approach to building out new MMIS systems. The services approach most commonly adopted over the past decade is better known as service-oriented architecture.

8.1.2 Service-Oriented Architecture

SOA is an application architecture within which business functions and selected technical functions can be invoked using documented interfaces. The World Wide Web Consortium (W3C) refers to SOA as "a set of components which can be invoked, and whose interface descriptions can be published (made available) and discovered (found)." SOA is an architectural Framework that can incorporate and integrate many different technologies. The focus is on defining cleanly cut service contracts with clearly defined functionality in a manner that is transparent to the underlying technology platforms that provide the functionality. In other words, SOA is an approach to EA where each major element is revealed and classified as a "service." The result is a distributed computing environment with a high level of interoperability between systems (i.e., flexible, easy-to-change, business agility).

Figure 92 is a high-level illustration of a flow that passes information requests from various access channels through the system into the data access layer. This layer selects the requested data and utilizes services to display the information to the appropriate

individual via the access mechanism. This diagram lists several business-type functions in the "Enterprise Business Service Integration" layer. At the core of the Enterprise Business Service Integration layer there are SOA capabilities, among many functions, orchestrating the integration activities being requested via service calls from the customer.

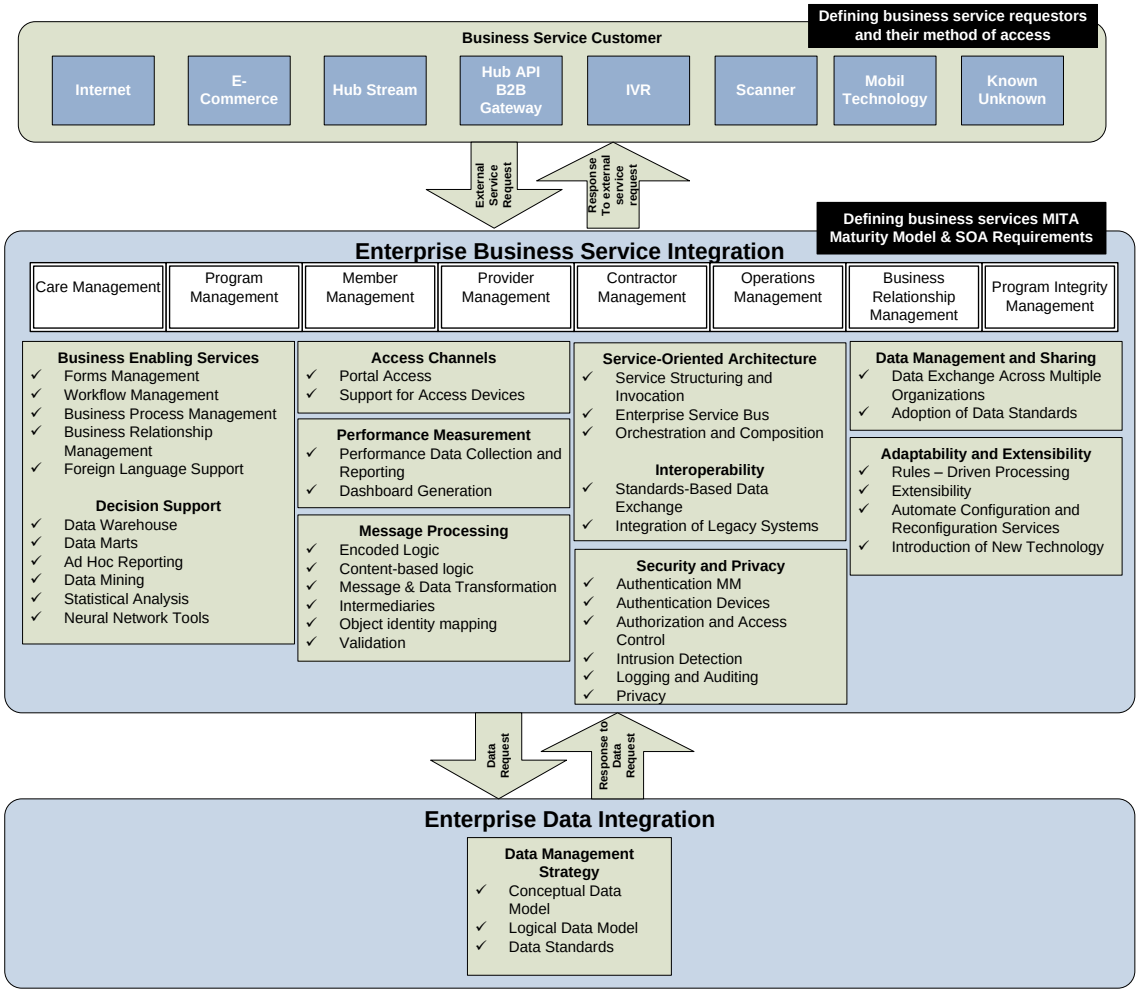


Figure 92: MITA Enterprise Business Service Integration Diagram

Another key component listed within the SOA area is the Enterprise Service Bus. The ESB can provide the foundation essential in establishing a loosely coupled service environment based on messaging. An ESB typically serves as a mediator between capabilities, providing a clean separation between the business aspects of a solution (i.e., provider enrollment functions) and the technical aspects (i.e., security, message routing, etc.).

As depicted in Figure 93, modern ESB products have evolved to handle some technical services (i.e., data transformation, transaction support, etc.). These ESB components are configurable and can be readily implemented to consolidate needed functionality because the data\messages are already using the ESB for transportation purposes.

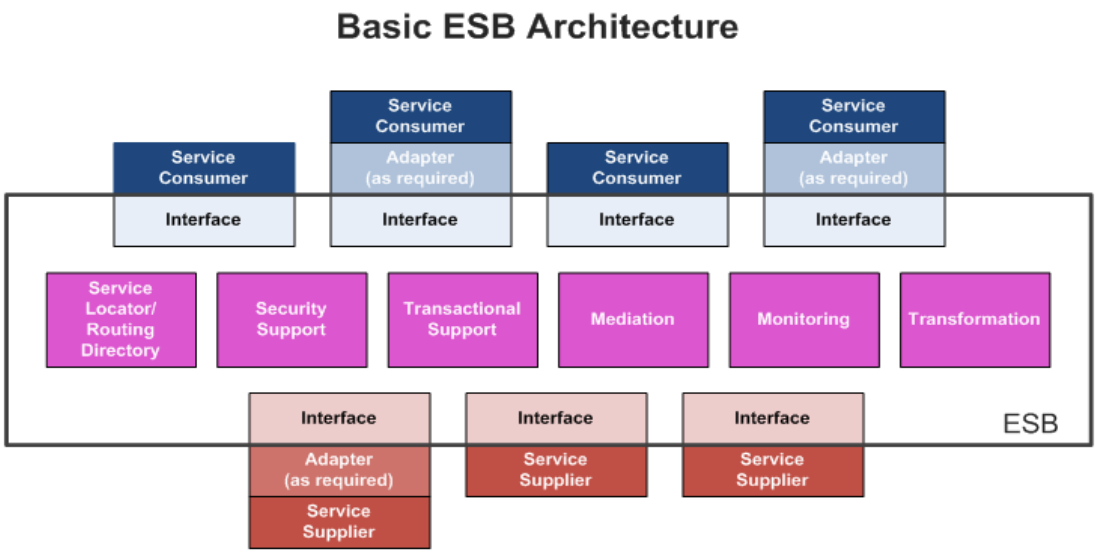


Figure 93: Basic Enterprise Service Bus Architecture

In the Medicaid enterprise, the term "services" often describes the tasks that are performed on behalf of a beneficiary participating in the Medicaid (or other covered) program. For example, physicians provide medical services to beneficiaries. From the MITA SOA perspective, however, the term service is used to discuss application services which are based on SOA principles. Application services support the business needs, called "business services", or provide commonly used technical capabilities, called "technical services." Each software service performs a defined function, which is documented in a service contract.

A service is the basic element in an SOA. A goal of an SOA is to provide services that have a concrete meaning on the business level. A service is a software element that provides a complete business process or function.

- **Service** – A resource that provides a capability of performing tasks that form a coherent functionality.

- **Business Service** – Corresponds to the logical implementation of a business process in a Web service. The business service contains a service maturity level description and a Business Service Definition Package (BSDP).

Conforming to general SOA principals, the MITA business services are to be built to support two capabilities:

- **Plug and Play** – An individual service can be replaced with a new implementation without impacting the rest of the enterprise. A service that is currently a wrapped COBOL application can be replaced with a COTS product or Java program without

changing any of the external interfaces. Additional details on service composition are listed on the next page.

- **Interoperability** – An external user of a service can change without impacting the service itself. Interoperability could delete, add or modify external services, or clients (A new service could be an application added to the business process flow that takes as input the output from an existing service).

Software services (Figure 94) look identical on the outside, possessing the same input, output, and behavior, but internally may differ considerably from one service to another. In other words, software services can be all custom code, a COTS product, wrapped legacy code, a combination of the above, or a composite of other services.

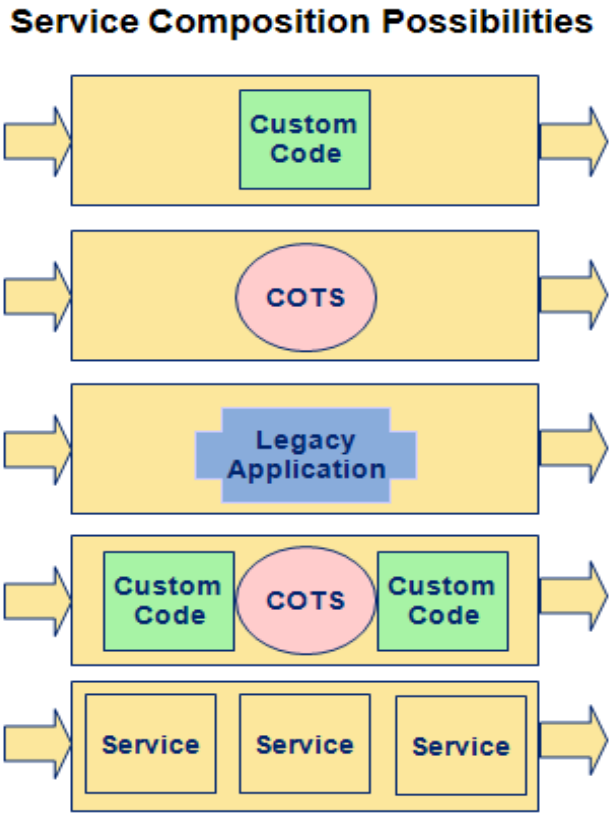


Figure 94: Software Service Composition Possibilities

In the MITA Framework a business service must have the following associated data:

- Service name is the name by which the service is invoked
- Formally defined interface – the interface is defined by using the Web service Definition Language
- Behavior characteristics
  - Business logic – describes what goes on under the hood of the business service

- Service contract – describes the expected behavior of the interface (e.g. whether the interface a real time or online interface)

❒ Business Service Definition Package is a MITA-defined set of metadata describing the service

The business service's objective is to provide an independent version of a business process that can be woven together with other services to form composite business processes. A service contract is defined by the Web Service Definition Language and service patterns. Orchestration is done using Business Process Execution Language. More information on this topic is included in the next subsection.

The SOA paradigm shift in structuring an organization's computer applications has revealed three main aspects that must be addressed to manage the movement to services. These items, which follow, will help differentiate the responses received to the MES RFP.

❒ Service management and orchestration

❒ Adoption governance

❒ Maturity roadmap

These three SOA areas are briefly described in the following subsections.

8.1.3 SOA Service Management/Orchestration

When breaking functionality of systems into services, it is essential to provide a mechanism to manage the services offered. The SOA model is based on loosely coupled standards which require both a SOA Registry and a SOA Service Broker. The functionality provided by the SOA Registry and the SOA Service Broker manage the information necessary to implement services either independently or in an orchestrated fashion.

The SOA Service Broker usually is handled by an ESB service, as briefly described in the previous section. Figure 95 depicts a SOA Service Manager component in the middle of the model acting as an orchestrator of the SOA process. The SOA Service Manager would consult the SOA Registry to get details of the full business process so that it could be monitored (SLA Monitor). The Service Broker handles the messaging responsibilities needed by the MITA business services or combination of services known as a business solution set (not shown here). A conceptual diagram of the relationships follows.

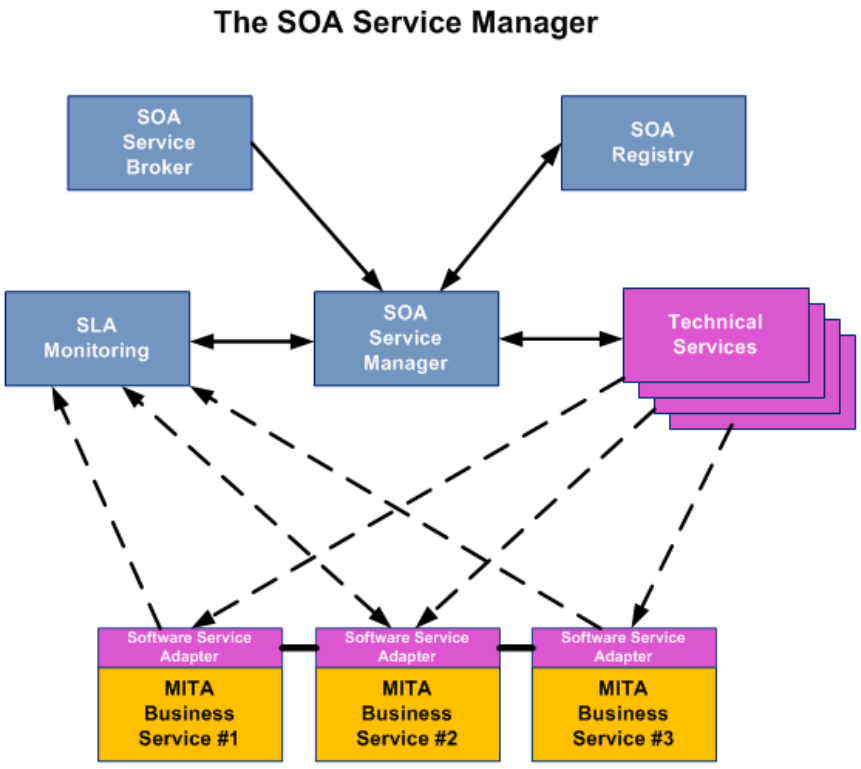


Figure 95: SOA Service Management Conceptual Diagram

As described in Figure 95, orchestration of MITA business processes are done using Web Services Business Process Execution Language (WS-BPEL), which is an Organization for the Advancement of Structured Information Standards (OASIS) standard language for specifying interactions with Web services. Processes in BPEL export and import data by using Web service interfaces exclusively. A model business process flow diagram (Figure: 96) follows.

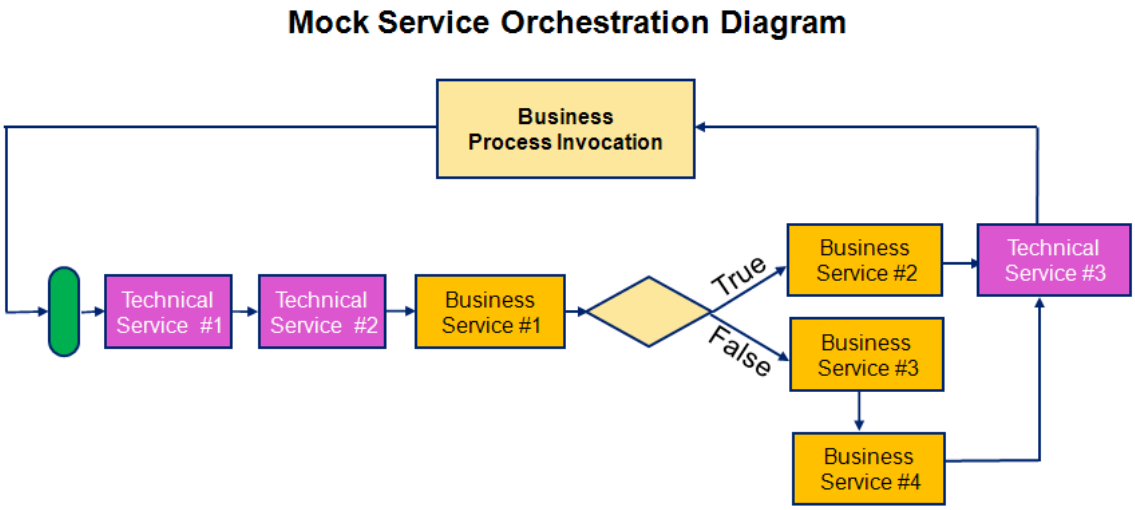


Figure 96: Sample Illustration of Business and Technical Services

Note: Throughout this document flow diagrams are presented to illustrate the positioning of business and technical services within particular MMIS business processes. The dark orange boxes with black lettering depict MITA business services while purple boxes with white lettering depict technical services (both MITA and industry) as shown above. Other colored shapes (boxes included) are general in nature.

Services are a critical element to the changes introduced within the MITA Framework. MITA uses the same methodology to define MITA services as the industry has used to define Web services. The interface to all services will be defined using WSDL, and all messages and data will be defined in XML. This does not indicate that all MITA services are available as Web services, only that their interfaces are defined using the same mechanisms as Web services. The business services define the business processes that must be exposed and defines their standard interfaces. Technical services define the technical functions that must be exposed and defines their standard interfaces to be used as enablers for the given business services.

General service flow characteristics are as follows:

- Services are loosely coupled
- No predefined predecessor or successor services to an individual service
- Services configured through use of a service contract and an orchestration language (i.e., BPEL)
- Changes to the flow of services through changes to the orchestration, not by changes to the service
- Interfaces between the services must be compatible

MITA services are implementation-neutral. Portions of the WSDL-defined interface are not defined as part of MITA but are left open for the states to complete once they decide on their architecture's physical implementation. This provides states with the ability to adapt MITA to their specific physical implementation while still preserving MITA's goal of interoperability.

A principal characteristic of a service is that it is loosely coupled. Coupling describes the number of dependencies between a service consumer and supplier (the term "provider" is sometimes used synonymously with "supplier," but we use the latter in order to avoid confusion with typical Medicaid usage of "provider"). Loosely coupled services have few, well-known and well-managed dependencies. Tightly coupled services have many known and, more importantly, unknown dependencies. The degree of coupling directly affects the flexibility and extensibility of a system. Technical services play a major part in enabling the business services. In essence, technical services will flesh out the technical details for the proper flow of information throughout a system.

8.1.4 SOA Governance

Another critical component of a SOA environment is the concept of governance. SOA Governance should ultimately be about delivering on business and SOA objectives. This structure links SOA investments to business goals and initiatives and ensures proposed modifications fit into the context of the overall IT Governance Framework. For example, one of the primary responsibilities of a SOA Governance Workgroup is to establish design and tool standards across the enterprise. Its second responsibility is to establish policies, processes, and service criteria. The following lists examples of the policies that could be developed by this workgroup:

- All service interfaces must be WS-I compliant
- All external service calls must use WS-Security
- All asynchronous interfaces must use WS-Addressing

Adopting SOA requires more than just a technology shift. Policies to encourage desirable behavior among employees must be part of your SOA governance. Specific areas that need to be considered include:

- Assigning and empowering employees who are responsible for driving process improvement (SOA is about improving business processes, thus someone needs to be responsible for making it happen.)
- Developing the skills necessary for architecting, building, testing, and deploying services and service-oriented applications
- Creating incentives to encourage the building of sharable services and the reuse of existing services
- Forming an Enterprise Architecture group to drive adoption of EA disciplines and SOA in particular
- Creating a group that is specifically tasked with governing the SOA Roadmap

Typically, the SOA Governance group consists of representatives from EA, the different lines of business, and finance. Failure to address organizational and change management issues will lead to slow SOA adoption that lacks coherence, because employees aren't empowered (through organizational structure, training, and incentives) and are not held accountable for delivering on SOA benefits.

8.1.5 SOA Maturity Roadmap

The diagram below (Figure 97) illustrates an approach to achieving an Enterprise SOA structure and governance. This three-level approach builds on maturity through a three-year program.

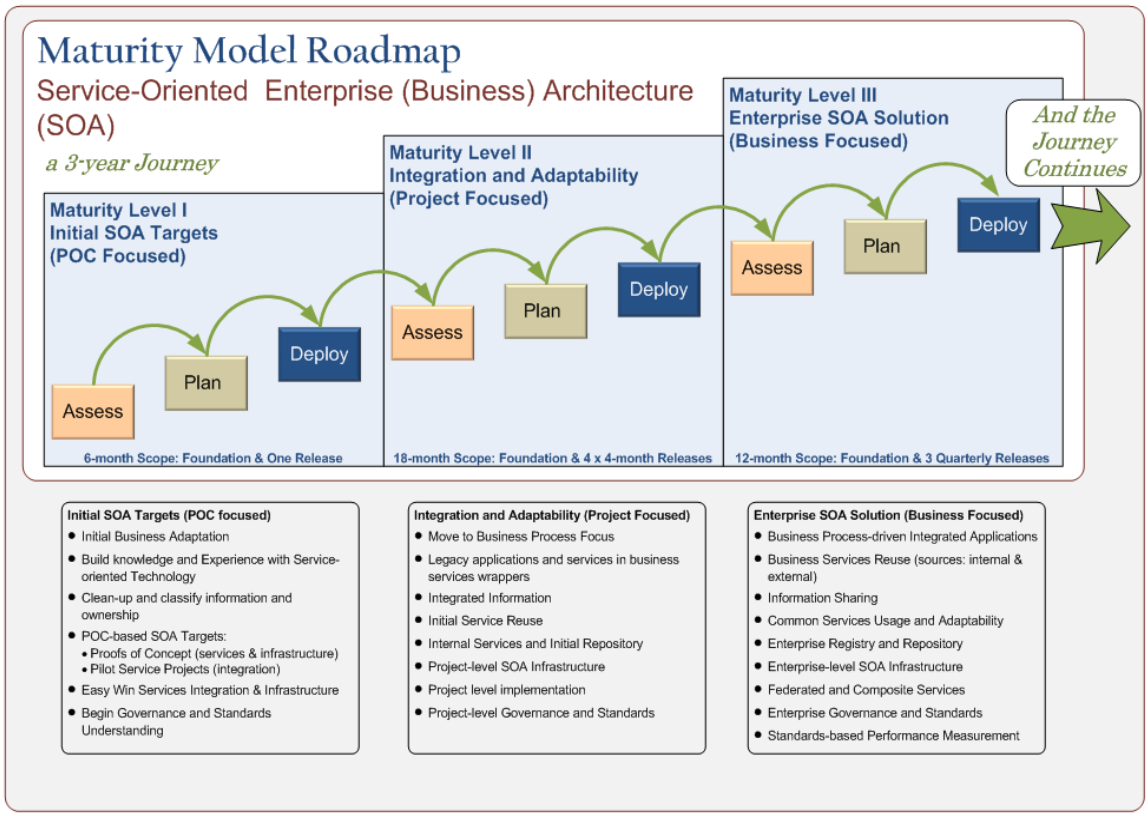


Figure 97: Example Enterprise SOA Roadmap

There are other known SOA roadmap approaches that present this process in greater granularity (for example, see Table 47). Most, if not all, of these published roadmaps suggest its best to start small and build on both failures and successes to achieve the benefits of a true SOA-based organization.

Steps	Implementation Phase	Organizational Adoption	Implementation Timeline	ROI
1	Point to Point Integration	• Business Case • Funding Model	• Heterogeneous Systems with Proprietary Interfaces • Wrap Legacy Systems in Services Interfaces	Reduce Integration Costs

Steps	Implementation Phase	Organizational Adoption	Implementation Timeline	ROI
			• Secure Service Interfaces	
2	Loosely Coupled Services	• SOA Pilot • Center of Excellence	• Create a Governance Framework • Manage Services	• Reduce Redundancy • Increase Customer Value through Service Reuse
3	Abstract Business Services	Department SOA	Service Intermediaries	Increase Visibility & Control
4	Service-Oriented Business Applications	• Service Domain-Centric • Cross-Org SOA	Service-Oriented Process	Empower the Business
5	Enterprise SOA	Enterprise Wide SOA	• Enterprise Mashups • Service-Oriented Enterprise	Improve Business Agility

Table 47: Step SOA Breakdown Roadmap

8.2 Appendix B – Potential Data Flow Model

The following diagrams (Figure 98, Eligibility Adapter Process and Figure 99, Inquire Member Overview Model) depict Member Eligibility process flow of receiving 270 XML Request (Eligibility Request) and generating 271 XML Response (Eligibility) along with sample XML schema file high-level use case diagram.

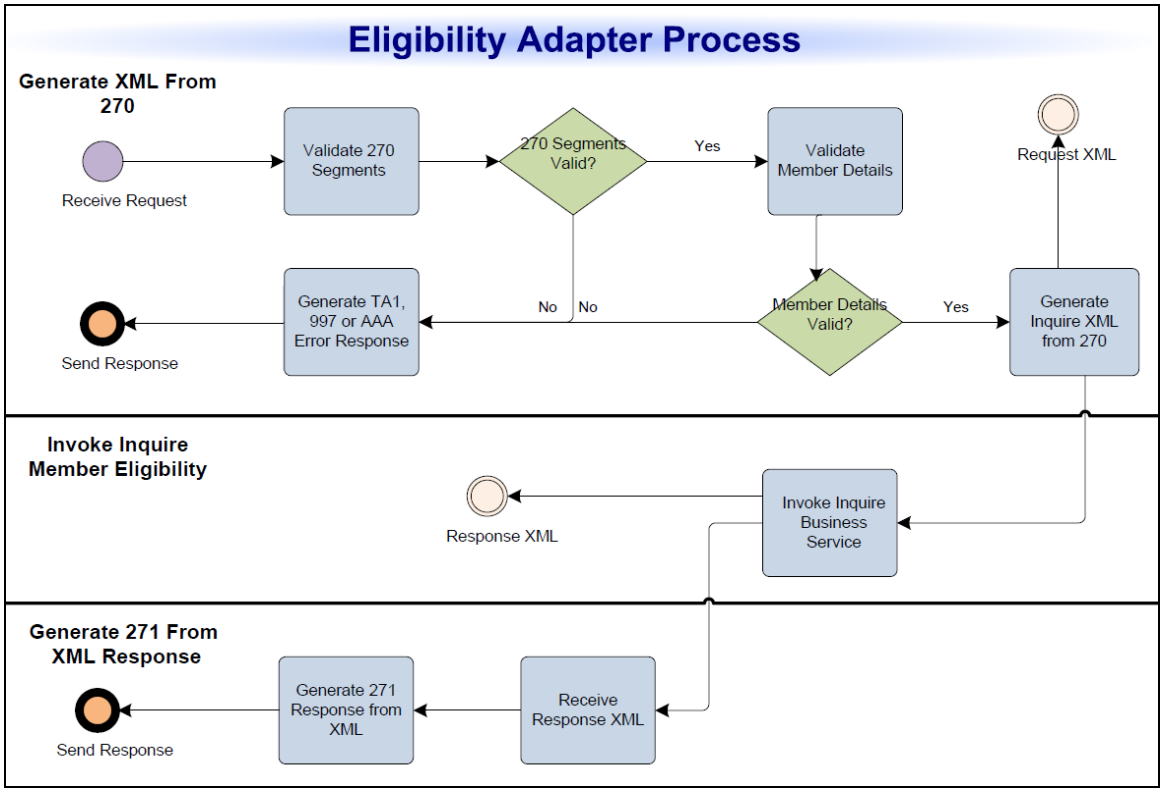


Figure 98: Eligibility Adapter Process Diagram

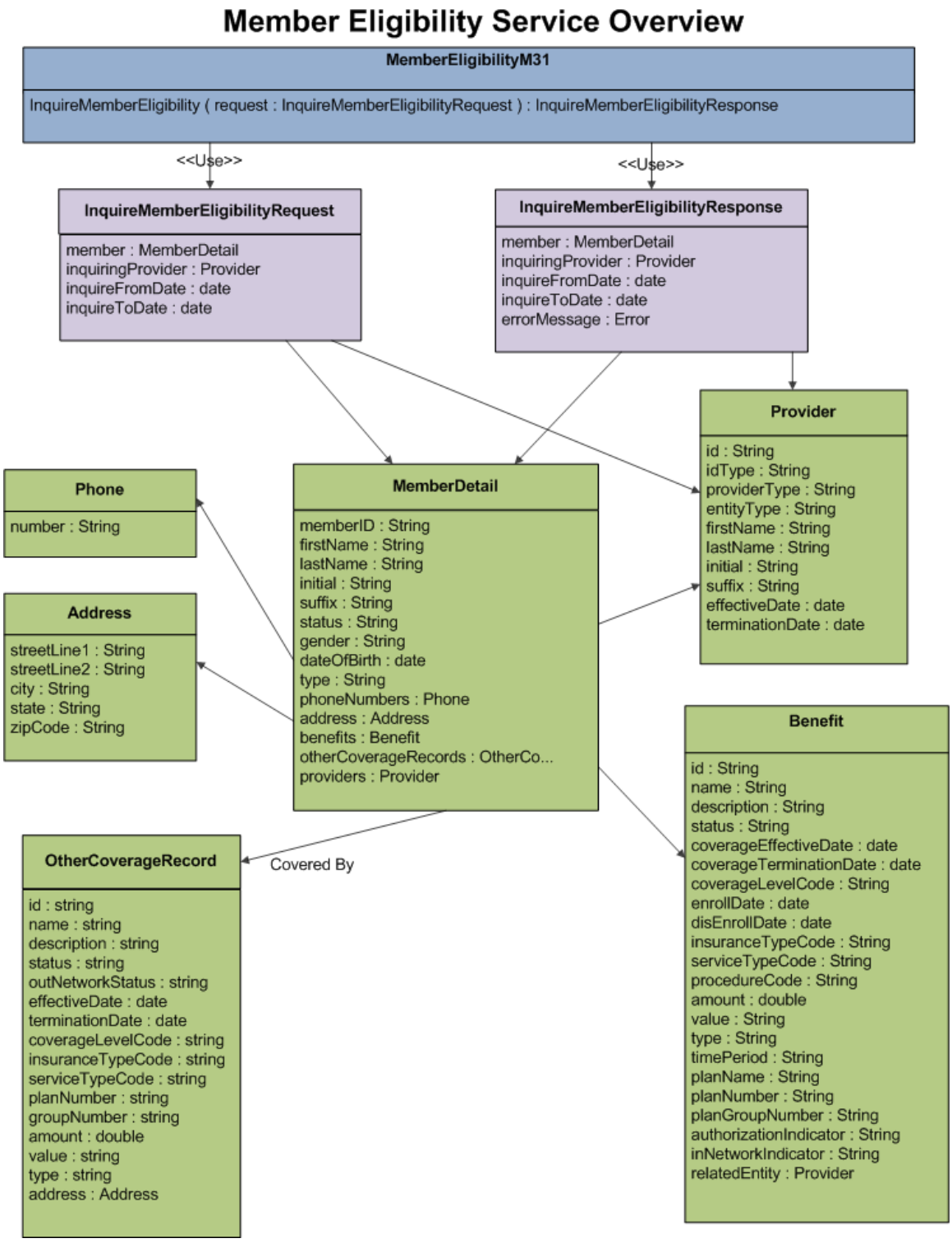


Figure 99: Inquire Member Overview Model

8.3 Appendix C – MITA Business Process Sample Matrix

The following is a matrix showing the MITA business process samples provided in this document:

Group	BP #	Business Process	Category	Vision Sessions	Samples Provided in Document
Business Relationship (4)	BR1	Establish Business Relationship	Business Relationship Management (BR)		Yes
Care Management (4)	CM2	Manage Case	Care Management (CM)	Establish & Manage Case	Yes
Contractor Management (9)	CO9	Inquire Contractor Information	Contractor Management (CO)		Yes
Member Management (8)	ME4	Inquire Member Eligibility	Member Management (ME)	Eligibility Inquiries	Yes
Operations Management (26)	OM12	Prepare EOB	Operations Management (OM)	Payment & Reporting	Yes
	OM7	Audit Claims Encounter	Operations Management (OM)	Claims/Encounter Adjudication	Yes
	OM26	Manage TPL Recovery	Operations Management (OM)		Yes
	OM22	Manage Drug Rebate	Operations Management (OM)		Yes
	OM2	Authorize Service	Operations Management (OM)	Service Authorization	Yes
Program Management (19)	PG2	Develop and Maintain Benefit Package	Program Management (PG)	Benefit Administration	Yes

Group	BP #	Business Process	Category	Vision Sessions	Samples Provided
Program Integrity (2)	PI1	Identify Candidate Case	Program Integrity (PI)	Indentify & Manage Case	Yes
	PI02	Manage Case	Program Integrity (PI)		Yes
Provider Management (7)	PM3	Inquire Provider Information	Provider Management (PM)	Provider Info Inquiry	Yes
	PM06	Manage Provider Information	Provider Management (PM)		Yes

Table 48: Crosswalk MITA Business Process Sample